ELECTRICAL WEST

~~1936~~

1937

LOOKING forward into 1937 the electrical industry of the Far West sees: Record-breaking loads on the lines of the utilities. Increasing customer demand for goods and services. A $100,000,000 electrical appliance market. An upward surge in both new construction and modernization. Improved economic conditions throughout the entire region. Starting the year with these capital assets, the industry should attain new levels of profits and prosperity for every one of its numerous branches.

McGRAW-HILL CO., OF CALIFORNIA
Price 25c Per Copy

JANUARY 1937

TK1
.E495

THE RISING TIDE OF RANGE SALES

PRACTICALLY EVERY ELECTRIC APPLIANCE has passed through the same stages in its selling history. First, there is the pioneering stage; second the period of slow growth; then general acceptance by the top income groups; and finally swift progress toward universal use.

The dealer's big profits start when the third stage is reached and that is where the electric range is now. There is no question but that in a comparatively short time it will represent the major profit source in the appliance business.

A recent check-up shows that only 70% of the dealers selling other major appliances are handling ranges, too, so the field still offers real opportunities for the wide awake dealer.

The Edison Company will merchandise ranges even more aggressively this year than ever before. Equally aggressive effort on your part will add much to your 1937 profits.

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

1-37

Edison

CALIFORNIA'S *Electrical Age* HAS JUST BEGUN!

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), January, 1937, Vol. 78, No. 1. Published monthly by the McGraw-Hill Company of California, 883 Mission St., San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shilling). Single copy, 25c.
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ELECTRICAL WEST

With which are consolidated the "Electrical Journal," the "Journal of Electricity, Power and Gas," and the "Journal of Electricity."

ESTABLISHED 1887

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▼

• ENGINEERS were presented in last month's issue with the first group of engineering reports of the R.M.E.A. The second and concluding group will be found in this issue on page 45. Among them, page 48, is the report of a hydro-plant modernization which doubled capacity at a fraction the usual cost per kva. Boiler modernization is subject of a report from the N.W.L. & P. Assn., page 42.

•

• CONTRACTORS of northern California convened at Fresno last month. Plans for a big year were launched. This and other contractors' news is in the Trade Associations section, page 52.

•

• MOTORMEN, meaning those interested in the electrical repair shop, may familiarize themselves with a typically modern establishment by turning to page 56.

•

• RURAL ELECTRIFIERS will find a detailed survey of electrical-equipment-use in one rural area. Hood River Valley, on page 30.

•

• DEALERS receive another sales stimulant, this time injected into the Mixers line by the Appliance Sales Guide, page 37.

• THE INDUSTRY, sales promoters especially, can survey an outstanding appliance show, study a successful promotion in small northern towns, follow other strides in cooperation beginning on page 32.

•

FEBRUARY

Construction and sales programs of the western industry which point to a year of aggressive expansion will appear next month in the Electrical West annual Statistical and Review issue. Bringing these into relief as a significant up-trend will be the record of achievements for 1936.

•

1937

Appliance Sales Guides will appear throughout the year on the following subjects:

January	—Mixers
February	—Ranges
March	—Water Heaters
April	—Refrigerators
May	—Home Laundry Equipment
June	—Roasters
July	—Modernized Kitchen
August	—Radio
September	—I.E.S. Lamp and Complete Sales Guide
October	—Running Water
November	—Table Cookery
December	—Sun Lamps

GOING PLACES IN 1937

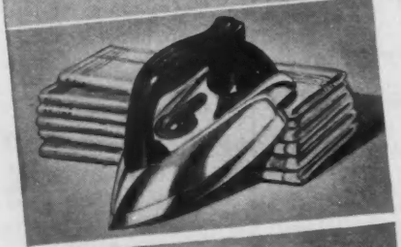
and what a start!

WESTINGHOUSE REFRIGERATOR OVER-ALL ECONOMY WINS U. S. PUBLIC WORKS ADMINISTRATION ORDER FOR 16,697 REFRIGERATORS

Two sensational selling angles — including the world's largest single refrigerator order — give Westinghouse dealers what it takes to hit top speed right from the word "GO." Right now is a good time to get the facts about the 1937 Westinghouse sales and advertising plans.

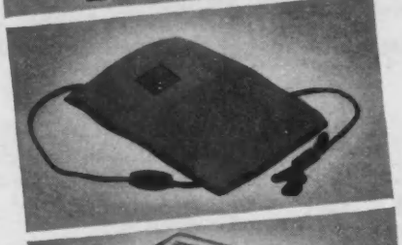
Write us direct or get in touch with the Westinghouse Refrigerator distributor in your territory.

4 GREAT APPLIANCE



6 TEA TOWELS

— pure linen weft — offered *free* with the Streamline Adjust-o-matic Iron; also 2 months' supply of Satina — all for the price of the iron alone. Advertised to 12,250,000 families in full color pages.



WARMING PAD SPECIAL

3-heat warming pad — specially priced for this activity. This, too, is an advertised special — timely, a fast-turning volume-sale item.

ROASTER GRILL

Featuring the new, sensational Broiler Grid which *broils, fries* and does *surface cooking* — the only double-purpose unit in the field.

Advertised in full color pages to 12,250,000 families.

DUSTER CLEANER SPECIAL

Another timely seller — another attractively priced special. Stock these for extra demand supported by full color page advertising to millions of families.

Westinghouse *the line of least resistance*

Westinghouse RANGE AND WATER HEATER PROGRAM

What kind of women buy electric ranges? Why do they buy? How do they use their ranges — and do they like them? To get reliable answers to such questions as these Westinghouse sent trained investigators to interview hundreds of electric range owners and users.

Dealers, too, gave facts of vital importance about their electric range selling activities — and their salesmen contributed new facts from their personal retail sales experience. Some of the information is actually startling in its significance. Utility executives, commercial managers, home economists and directors of home service furnished more facts — and this great accumulation of specific business data is NEW—POINTED—and is the foundation for the Westinghouse 1937 Range and Water Heater Program. It will help you sell more electric ranges.

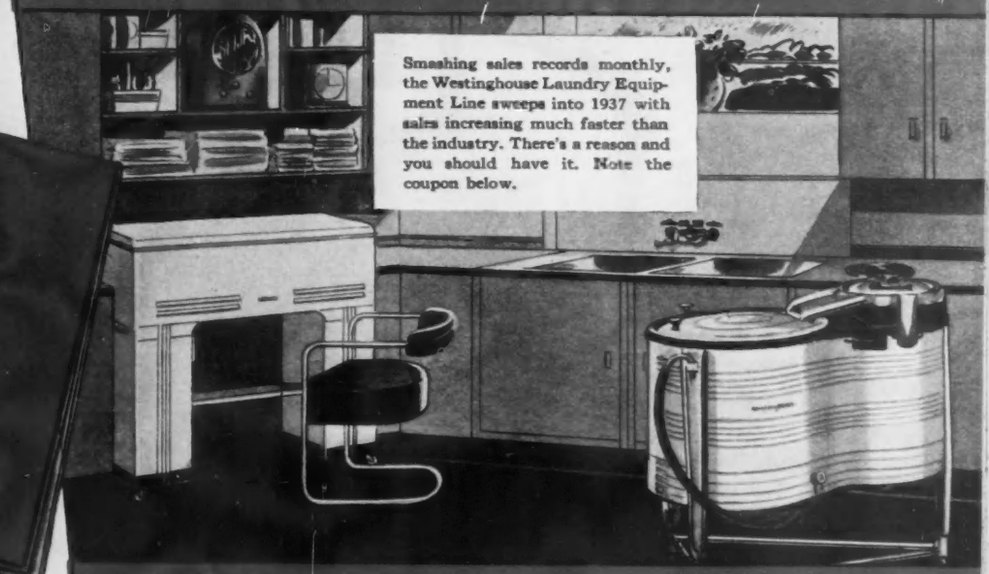
BASED ON FACTS
FACTS! FACTS!

PROMOTIONS

A PLANNED YEAR-THROUGH PROGRAM

— puts Westinghouse retailers on the inside track to appliance sales and profits.

DOMINATING QUALITY



Smashing sales records monthly, the Westinghouse Laundry Equipment Line sweeps into 1937 with sales increasing much faster than the industry. There's a reason and you should have it. Note the coupon below.

Westinghouse *Laundry Equipment*

ASK FOR PROFIT FACTS

Westinghouse Electric & Mfg. Co.,
Merchandising Division, Dept. FL-7161, Mansfield, Ohio.
Send me information on items checked below:

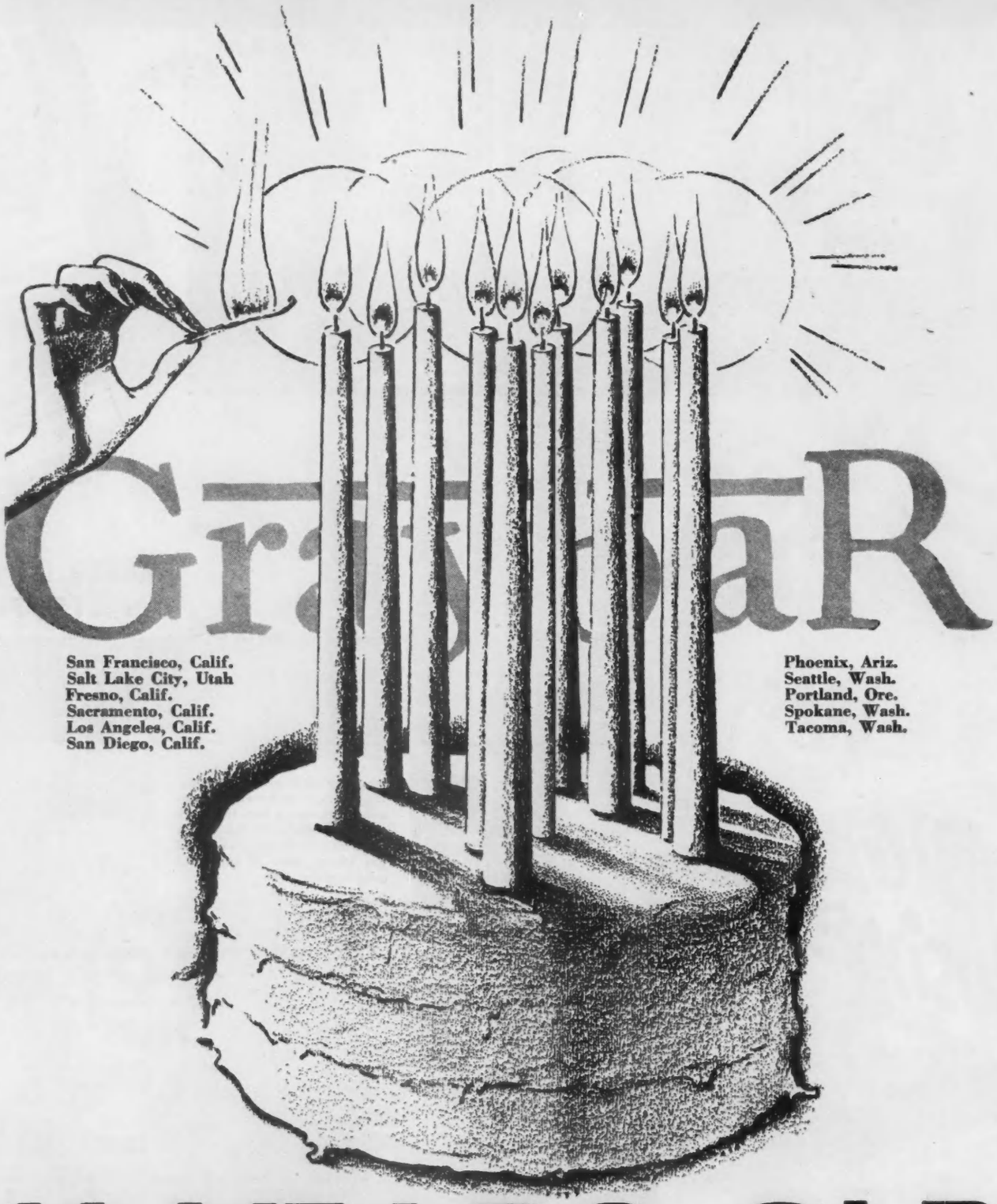
- ☐ 1937 Refrigerators
- ☐ 1937 Ranges and Water Heaters
- ☐ 4 Appliance Promotions
- ☐ 1937 Laundry Equipment

Name.....

Address.....

City.....State.....

Every house needs **Westinghouse**



GraybaR

San Francisco, Calif.
Salt Lake City, Utah
Fresno, Calif.
Sacramento, Calif.
Los Angeles, Calif.
San Diego, Calif.

Phoenix, Ariz.
Seattle, Wash.
Portland, Ore.
Spokane, Wash.
Tacoma, Wash.

11 YEARS OLD

68 YEARS IN BUSINESS

In 1869, Gray and Barton; in 1882, Western Electric Supply Department; since Jan. 1, 1926, GRAYBAR

Again NORGE LEADS

Sales Closed *Quickly* Build up Profits *Quickly*

•

The New Norge Electric Ranges Lead in Vital Values—that Make Prospects "Buy Now"

EVERY DEALER wants to handle a line that has natural sales appeal—it puts the odds in his favor every time a prospect walks in. Norge products are *planned* with that in mind. That's why Norge sets new sales records year after year.

The new Norge Electric Range is one of the greatest natural sellers Norge has ever introduced to the home appliance field. It has vitally different, ultra-modern features—advancements in construction that appeal to a prospect's reason as well as his eye.

And behind all this is the greatest sales promotion and advertising campaign in Norge history. 1937 is going to be even greater than 1936 for Norge dealers. Get in touch with the Norge distributor in your vicinity and get full details. Be a money-making Norge dealer—and start hanging up some records for yourself. Liberal finance plans make it *easy* to be a Norge dealer.

NORGE DIVISION *Borg-Warner Corporation, Detroit, Michigan.*

EXTRA LARGE OVEN—
EASIEST TO CLEAN

● *The unusually large oven in the Norge Electric Range has an immediate appeal to prospects. All shelves, racks and guides are quickly removable for washing. This feature makes a striking demonstration.*

Another Norge Vital Value that Sells Itself!

ROLLATOR REFRIGERATION (Domestic and Commercial)
•
GAS AND ELECTRIC RANGES
•
WASHERS AND IRONERS
•
WHIRLATOR OIL BURNERS

NORGE

New Electric Range ER-1

GAS BURNERS
•
FINE-AIR FURNACES
•
COAL STOKERS
•
AIR CONDITIONING
•
CIRCULATOR ROOM HEATERS

WOULD YOU PREFER

to sell or sell against

THIS REFRIGERATOR IN 1937!

FACT ONE:

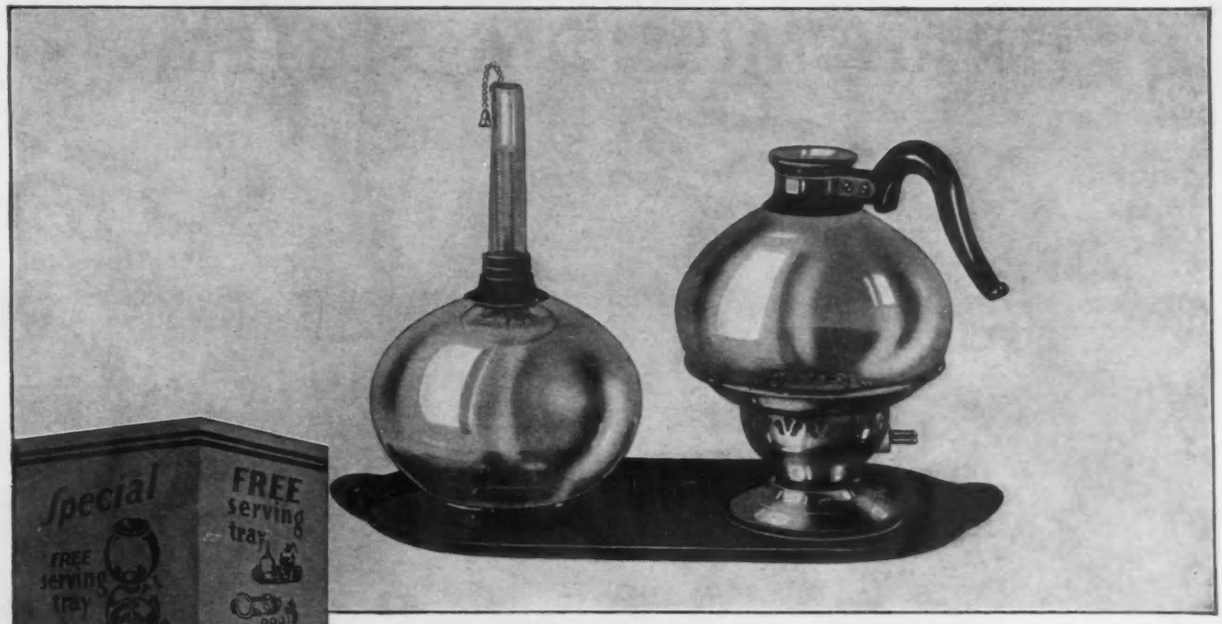
The new Kelvinator is Plus-Powered. It has as much as double the cooling capacity of other well-known refrigerators of equal size.

FACT TWO:

The new Kelvinator runs only half as many minutes per day—during the rest of the time it maintains low temperatures using no current at all.

And the program that goes with it is as different as the product

They're here



Electric Table Model with free tray in black or gleaming red, packed in this two color-box designed for use in window or counter display.
Cat. No. EC6-J---6 cup
Cat. No. EC8-J---8 cup
Add "R" or "B" to designate red or black
Order from your jobber today
$5.45 value for $4.95

Everyday Kitchen Model, with free tray, both in black only, packed in this two color-box for display in windows or on counters.
Cat. No. G6BJ---6 cup
Cat. No. G8BJ---8 cup
Order from your jobber today
$3.45 value for only $2.95

2 sensational-promotion items

Only $2.95

THE KITCHEN RANGE MODEL

with Black Tray $3.45 value

Greatest value offered in a Silex promotion. With each Everyday Kitchen Model, 6 or 8 cup size (black only) is packed a black Moldex serving tray. Here is just the tray for carrying a Silex glass coffee maker, or serving sandwiches or cocktails or highballs. $3.45 value for only $2.95. Offer expires February 28, 1937.

Only $4.95

THE ELECTRIC TABLE MODEL

with black or gleaming red tray - - - a $5.45 value

Now . . . complete coffee serving sets for buffet parties, at the height of the entertaining season. Sell the black trimmed Electrical Table Model with the black tray . . . or the popular gleaming red tray with the red trimmed Silex (6 or 8 cup size) . . . at the special promotion price of $4.95. Offer expires February 28, 1937.

Send for --- new --- powerful dealer mats --- FREE

PLACE YOUR ORDER TODAY

Genuine SILEX GLASS COFFEE MAKER
TRADE MARK REGISTERED U.S. PAT. OFF.

The Silex Company,
Dept. OOO,
Hartford, Connecticut

PRINT IN BINDING

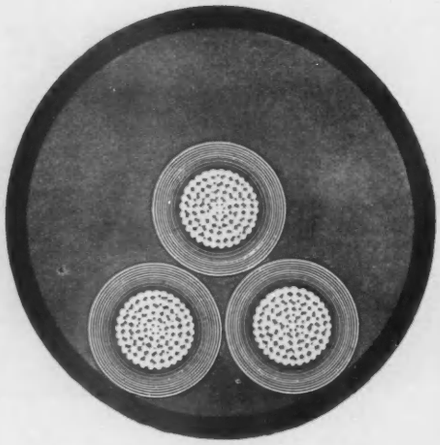
Bennett

OILOSTATIC

(Reg. U. S. Pat. Off.)

TRANSMISSION SYSTEM

The way to Big Savings in Construction and Maintenance



Power transmission by Pipe Line!

OILOSTATIC is not offered as a general substitute for the usual type of conduit construction in which distribution and transmission circuits are carried beneath busy city streets. Rather, it is offered as a reliable, rugged and flexible underground cable construction capable of effecting large savings in appropriate applications.

In open country and for many routes approaching heavy load centers it can often *compete with overhead line construction.* It is particularly applicable where overhead construction would involve high right-of-way costs and where there are physical conditions adverse to towers or pole lines.

OILOSTATIC will solve perplexing problems that may arise in connection with electrification projects, tunnels, bridges, railroad embankments, highways, airports, parks and golf courses; or in crossing swamps, rivers, lakes and bays.

Distinctive features of OILOSTATIC:

NO DUCTS. NO LEAD SHEATH. NO VOIDS IN THE INSULATION. HIGHER DIELECTRIC STRENGTH. GREATER INSULATION STABILITY. INCREASED CURRENT CARRYING CAPACITY. NO PRACTICAL VOLTAGE LIMITS.

Two OILOSTATIC installations, one at 132 kv. and one at 66 kv. are already in successful operation.

Our engineering services are always available. Inquiries on specific projects are invited.

THE OKONITE COMPANY

Founded 1878

and

HAZARD INSULATED WIRE WORKS DIVISION

THE OKONITE-CALLENDER CABLE COMPANY, INC.

EXECUTIVE OFFICE: PASSAIC, N. J.

New York	Boston		Chicago	Detroit
Philadelphia	Pittsburgh		Washington	San Francisco
Los Angeles	Seattle		Dallas	Atlanta
Factories: Passaic, N. J.		Wilkes-Barre, Pa.		Paterson, N. J.

OKONITE QUALITY CANNOT BE WRITTEN INTO A SPECIFICATION

TIME EXTENDED

Your old window lighting shades still worth $1.00 each!

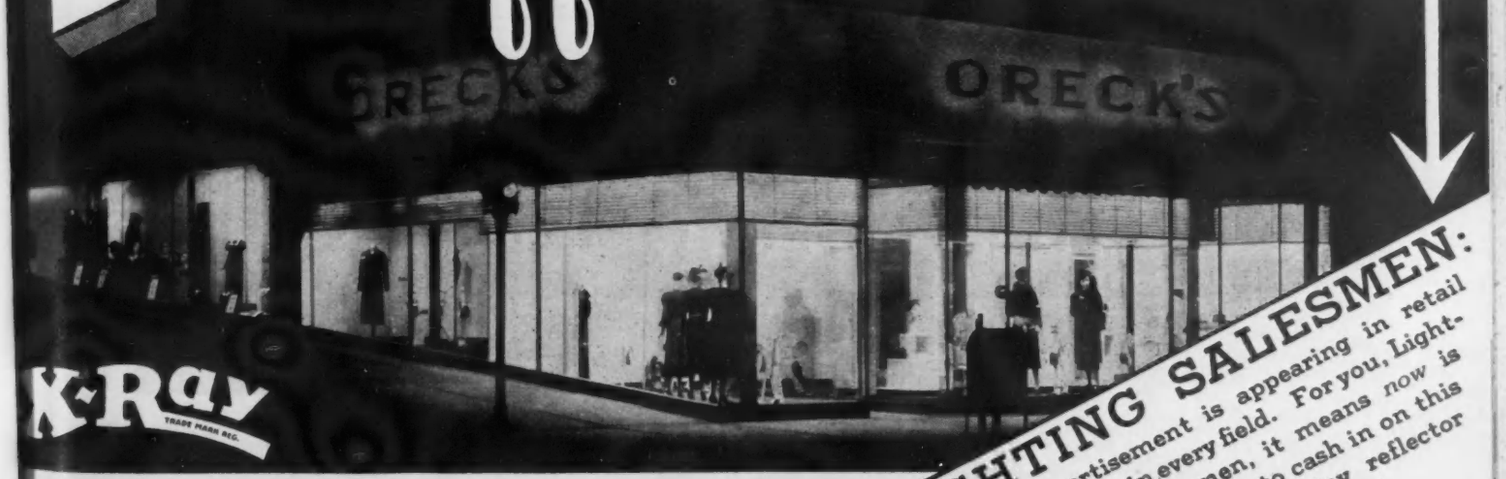
Good news to those merchants whose frenzied trade of the holidays left little time to indulge in store modernization. You can still get X-Ray better show-window lighting at the lowest price in history!

The Curtis TRADE-IN-OFFER has been extended! But, "Make hay while the sun shines" . . . turn in your antiquated lighting shades now and get $1.00's value for each on new X-Ray Reflectors . . . the powerful show window reflectors that put brilliant light on the "Attraction-Zone" and make your merchandise sell.

Details of the Curtis TRADE-IN OFFER are yours for the asking . . . tear off the coupon, sign your name, mail it today.

Curtis TRADE-IN offer

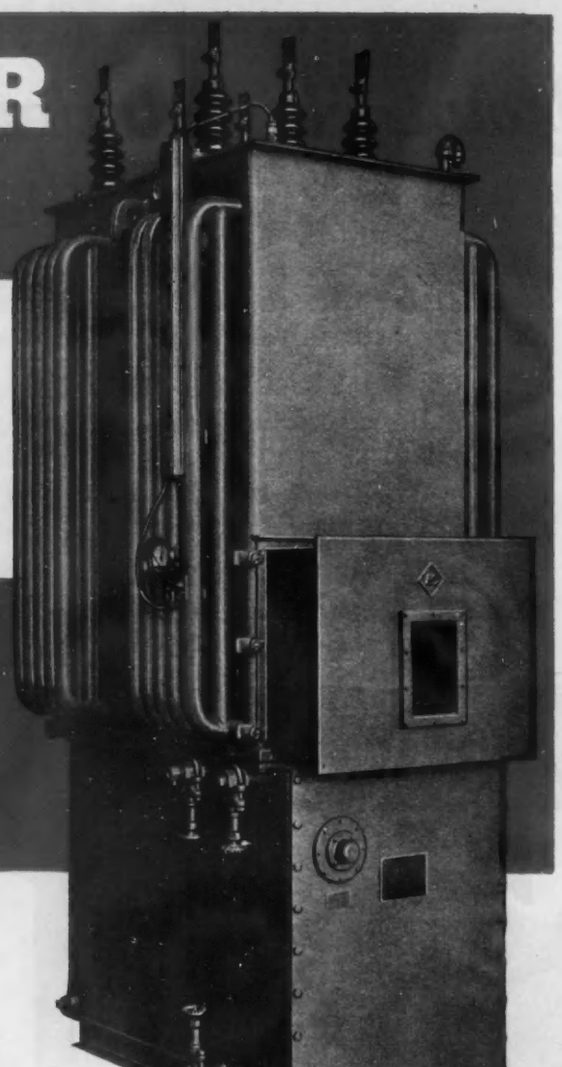
Mail Coupon **TODAY** *for further details*



HOW WINDOW LIGHTIN

LIGHTING SALESMEN: This advertisement is appearing in retail journals in every field. For you, Lighting Salesmen, it means *now* is the time to cash in on this Big X-Ray reflector market!

WATCH YOUR *STEPS!*



228 kva, 13,200 volt, 3-phase
AFR Regulator

ONLY ALLIS-CHALMERS OFFERS STEP-REGULATORS WITH

5/8% Steps

AS STANDARD EQUIPMENT

A REGULATOR provided with 5/8% *steps* can be used anywhere on the system, for the highest grade of urban installation or for any type of rural service. 5/8% *steps* permit setting the contacts of the contact making voltmeter closer than is feasible with larger sizes of steps. Furthermore, the use of 5/8% *steps* for a given relay setting results in fewer tap changing operations for a given application. In addition, 5/8% *steps* result in less contact deterioration for a given number of tap changes than is the case with larger steps. And remember 5/8% *steps* require no more taps, no more contacts, no more mechanism, and cost no more than larger steps.

TRANSFORMER DIVISION

ALLIS·CHALMERS

MILWAUKEE WISCONSIN

IF "WAR IS HELL"—

Then describe the ghastly toll at night of

SUDDEN DEATHS

War has been aptly described. In eighteen months the World War cost America 50,510 lives. But in the same length of time 53,650 lives were sacrificed on the highways of this nation.

The problem of automobile accidents can no longer be avoided. Death stalks the highway—particularly after dark. There were 36,000 motor fatalities in 1935. Of these, 20,000 occurred at night when traffic is only one-fifth of day time traffic but four times as dangerous.

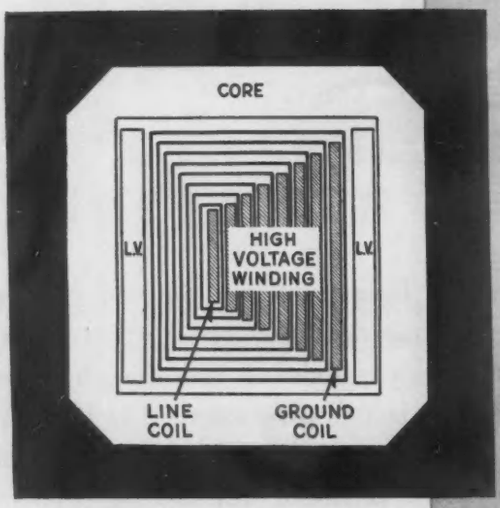
The electrical industry has a duty to perform *now*. Tests have definitely proven that proper street and highway lighting cuts this slaughter in half. Light is the answer and it is the duty of this industry to tell the public so! Let them know the price is small, but the benefits are beyond man's power to evaluate.

Hubbard and Company stresses that the *immediate* task is to make our highways *safeways* at night. Our engineering staff is ready to cooperate. And Hubbard's complete line of street and highway lighting equipment is designed to meet the needs of today. Write now for catalog.

● ***You are always assured of prompt delivery on Hubbard products. Just call your nearest branch of the General Electric Supply Corporation or the Graybar Electric Company. Stocks are complete.***

Hubbard and COMPANY

OAKLAND, CAL. PITTSBURGH CHICAGO



SHELL-TYPE TRANSFORMER INSULATION

Cross-section of half of a shell-type winding and core, the high-voltage winding designed for star operation with grounded neutral. An insulating cell, as indicated by the heavy black lines, surrounds each coil, forming a puncture-proof barrier to impulse voltages.

Seven especially-built Westinghouse single-phase power transformers are stationed at the receiving end of the Boulder Dam high-tension power line, in Los Angeles . . . and are the largest in the world. Each is equivalent in size to a pair of box cars standing on end, side by side. Rated capacity is 65,000 kv-a with 80,000 kv-a. available to meet peak emergency demands of short duration. All of these transformers are shell-type with surge-protection assured by coordinated insulation.

Coordinating . . . THE INSULATION OF POWER TRANSFORMERS

★ **Protects your capital investment**

★ **Reduces maintenance**

★ **Eliminates costly service interruptions**

SCIENTIFICALLY coordinating insulation provides the most effective safeguard against impulse, or lightning surge, voltages as well as assuring the best 60-cycle protection.

Coordinated insulation reaches its high point of effectiveness in Westinghouse shell-type power transformers. Solid, scientifically designed insulating barriers separate all windings from each other and from the core or tank. An insulating box surrounds every coil as shown in the cross section view on the opposite page. Dangerous creepage paths are eliminated.

Definite minimum impulse strength is assured without resorting to internal auxiliary devices that are potential hazards in operation. Impulse testing these transformers with either standard A.I.E.E. waves or *steep-front* waves will definitely prove their superiority.

Power companies everywhere are finding that Westinghouse Shell-Type Power Transformers, protected with Coordinated Insulation, are the most economical that can be bought. Designed, built, and tested with full regard to the application, these transformers fully meet the most exacting service.

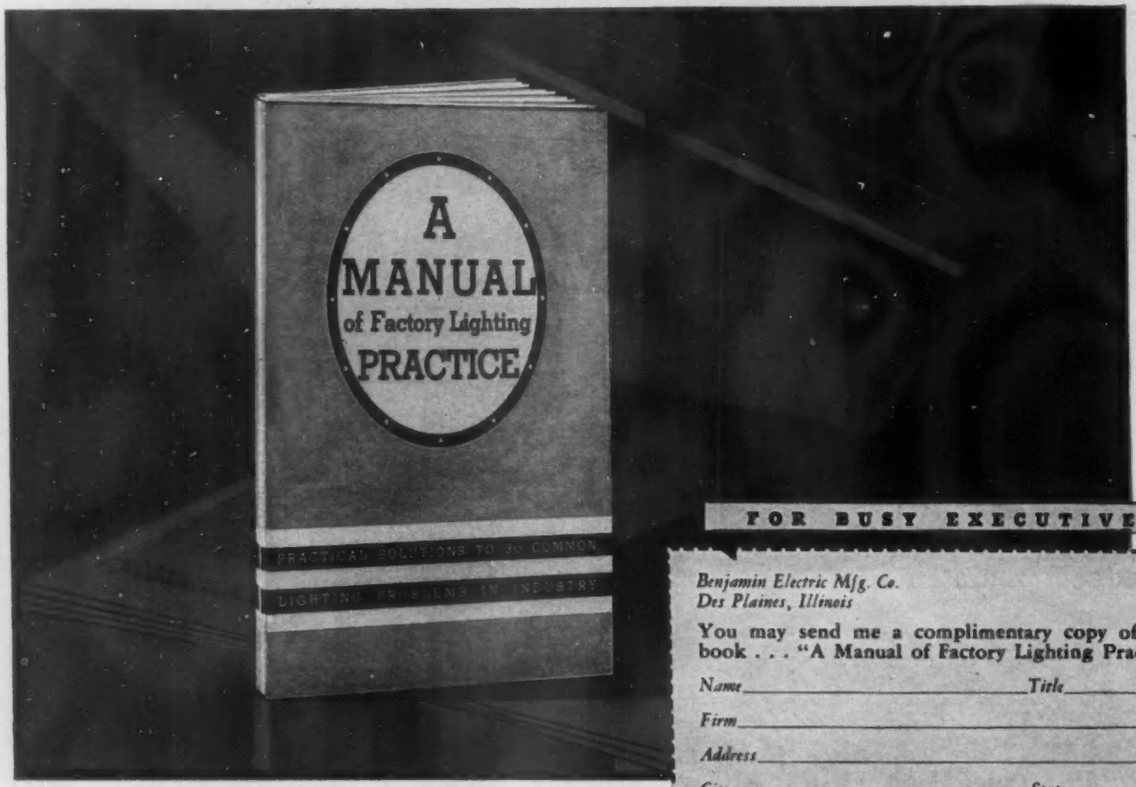
J 70030

Westinghouse builds both core and shell-type power transformers with Coordinated Insulation. Each has its distinctive merits. For the particular application, Westinghouse recommends the type best suited, basing this choice on economy of material and the adaptability of the design to the specific rating.

W WESTINGHOUSE ELECTRIC

Westinghouse

"A MANUAL OF FACTORY LIGHTING PRACTICE"



FOR BUSY EXECUTIVES

Benjamin Electric Mfg. Co.
Des Plaines, Illinois

You may send me a complimentary copy of your new book . . . "A Manual of Factory Lighting Practice"

*Name*_____ *Title*_____

*Firm*_____

*Address*_____

*City*_____ *State*_____

★ A NEW BOOK

TELLS HOW TO IMPROVE WORK STANDARDS AND CUT PRODUCTION COSTS ALL THROUGH PLANT

Here is a book every executive ought to read and pass along to his electrical maintenance engineer or chief electrician. To management, it gives a new insight into the breadth and scope of modern industrial lighting. To the operating executive, it provides the complete working data for up-to-date plant lighting.

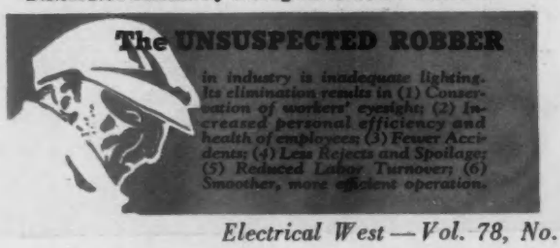
Written in easy-to-understand, non-technical language, the book outlines 30 specific lighting problems and gives a complete statement of how Benjamin Illuminating Engineers have solved each of them. A study of these problems will reveal how surprising improvements both in general and supplementary lighting often can be made at negligible cost; how easily lighting can be fitted to each plant operation with amazing improvement in work standards and lower production costs.

With the data contained in the Manual the operating executive can easily and quickly select the proper lighting to meet the "seeing requirements" of practically any operation. Typical of the subjects covered are . . . "How to secure good general lighting from the side where obstructions or building construction precludes the use of overhead reflectors" . . . "How to light spray booths . . . stock room aisles . . . drafting boards . . . signs . . . outdoor material storage dumps" . . . "How to assure getting rated life from lamps exposed to shocks" . . . "How to protect reflectors from loss of light output in dusty, dirty locations" . . . "How to light polished and non-polished parts for accurate inspection" . . . "How to check your present overhead lighting with the most modern approved standards", etc., etc.

This Manual is intended to be used as a basis for a complete CHECKUP of your plant lighting. The edition is limited—so may we suggest that you send for your copy today.

BENJAMIN
TRADE MARK
LIGHTING EQUIPMENT

Distributed Exclusively through Electrical Wholesalers

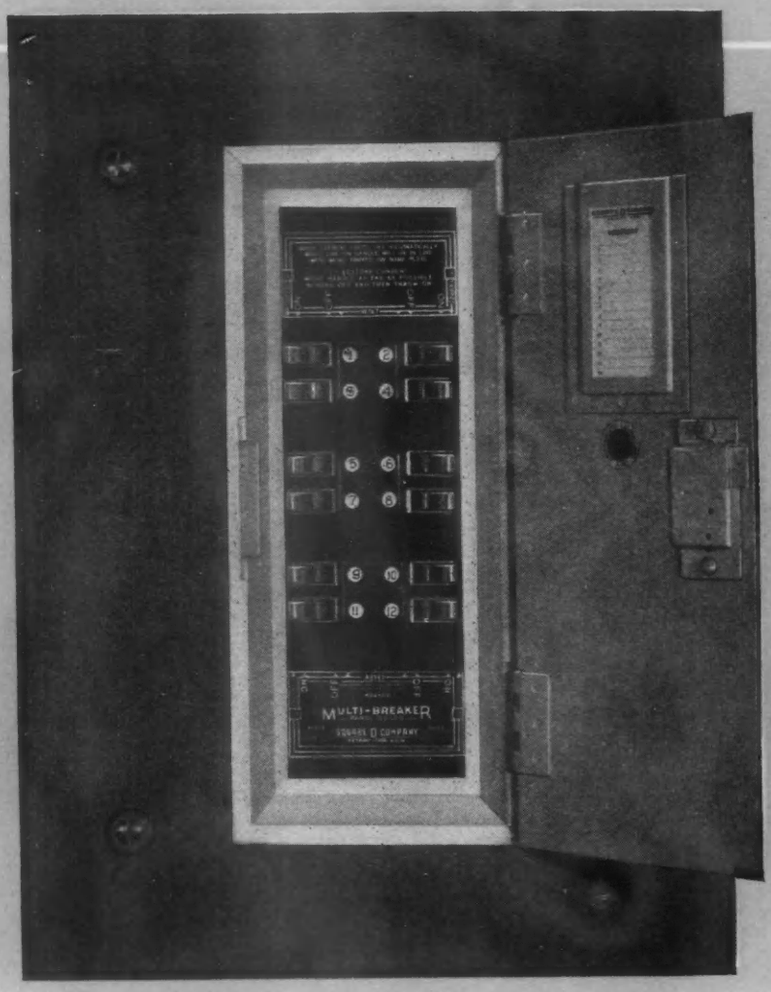

The UNSUSPECTED ROBBER
in industry is inadequate lighting. Its elimination results in (1) Conservation of workers' eyesight; (2) Increased personal efficiency and health of employees; (3) Fewer Accidents; (4) Less Rejects and Spoilage; (5) Reduced Labor Turnover; (6) Smoother, more efficient operation.

GREATER RESISTANCE TO POWER ARCS... another high spot in

TODAY'S TREND TOWARD PYREX POWER INSULATORS

PYREX is a Trade Mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

NEW ★ NEW



NEW ★ NEW

SQUARE D introduces the MULTI-BREAKER PANEL BOARD

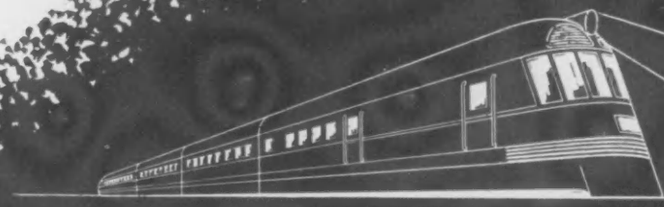
■ This new development of the Square D Multi-BreakeR provides circuit breaker protection and branch circuit switching up to 40 single pole A. C. circuits—and does so at a new low cost. ■ Also built in combinations of single and double pole circuits for 2 or 3-wire lighting distribution systems with branch circuit capacity up to 50 amperes. ■ This new unit is compact in design and replaces the usual fuse and switch cabinets.

SQUARE D COMPANY

LOS ANGELES - DETROIT - MILWAUKEE

SQUARE D COMPANY CANADA LTD. TORONTO, ONTARIO

CALL IN A SQUARE D MAN



Hotpoint

THE NAME EVERYBODY KNOWS

ANNOUNCES

A New Complete Line of Advanced Home Appliances Built for Volume Sales

★ ★ ★

BACKED BY A STREAMLINED SELLING PLAN THAT STREAKS THROUGH SALES RESISTANCE

See the complete Hotpoint line at the January House Furnishing Show, Stevens Hotel, Chicago.

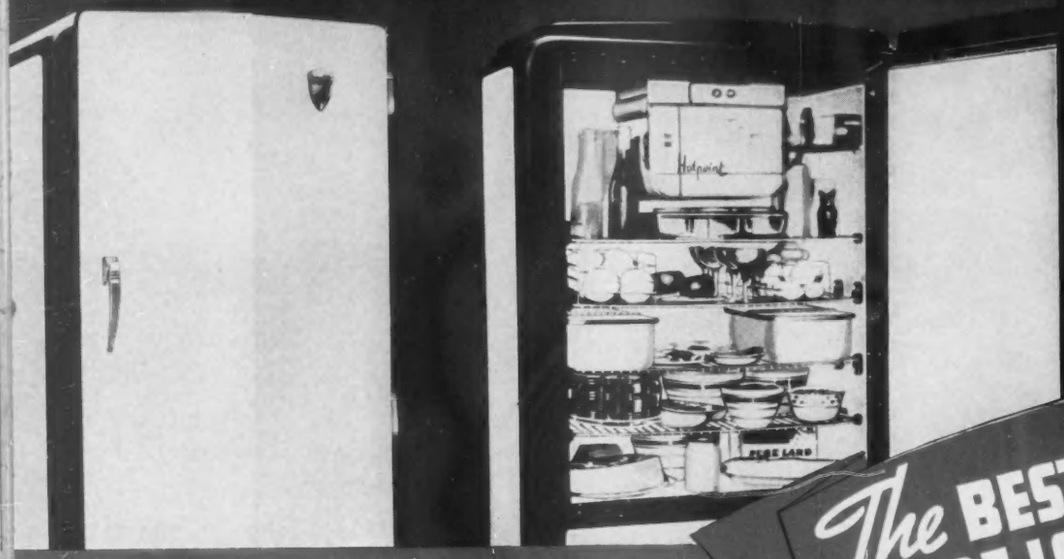
RIDE WITH Hotpoint IN 1937

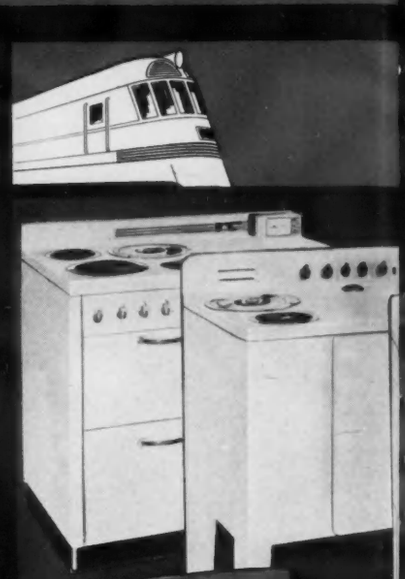
Hotpoint

The Name Everybody Knows
Offers for the FIRST Time...

COMPLETE FEATURES and

HOTPOINT REFRIGERATORS
3 complete lines of brilliantly styled refrigerators—
The Standard . . . The DeLuxe . . . The Imperial.

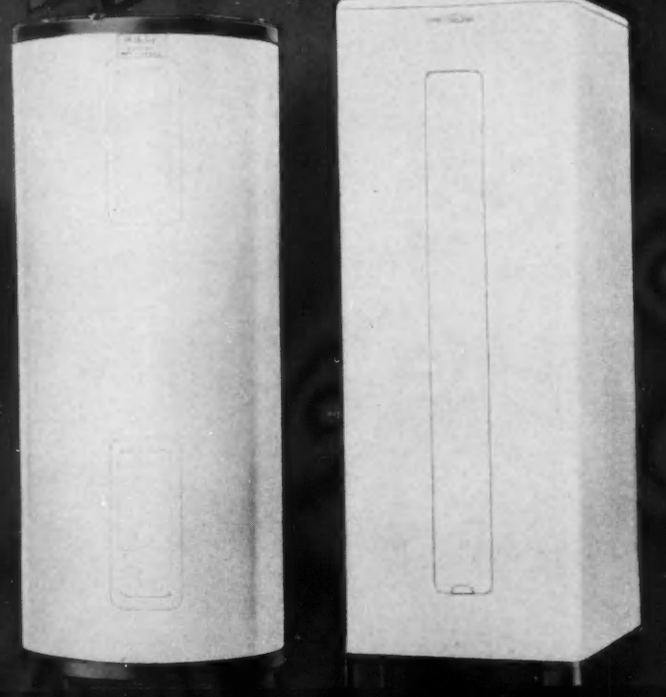




The BEST SELLERS OF 1937 BY Hotpoint

HOTPOINT HOME LAUNDRY EQUIPMENT
Hotpoint Washers and Ironers are tailored for fast turnover. Scientifically chosen colors enhance impulse sales value.

Hotpoint Water Heaters in all capacities.

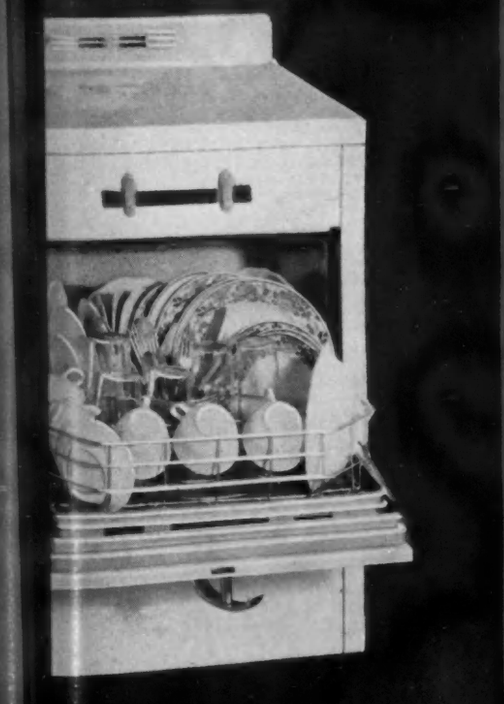


NEW LINE WITH ADVANCED BUILT FOR STREAMLINED SELLIN

FAST SURE PROFITS!

HOTPOINT ELECTRIC RANGES
The 1937 line of electric ranges is styled for the finest kitchens. Priced for volume sales.

The new front opening Hotpoint Dishwasher. Models to fit every kitchen. A natural for electric kitchen exploitation



BE prepared for a pleasant surprise when you see the new Hotpoint line of major appliances. You will be amazed at the abundance of easy-to-demonstrate features—the wealth of values that simply sell themselves. Never before in 30 years of marketing dependable electrical appliances have we introduced a line of products with such sure-fire sales advantages.

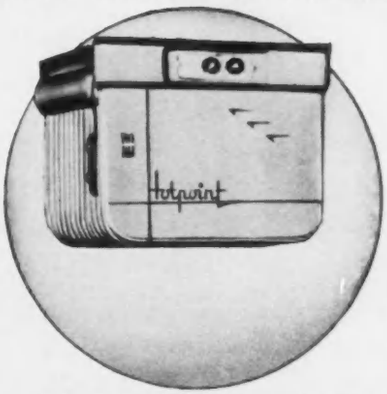
Every product in the new Hotpoint line is distinguished by the same standards of dependability, long-life and economy which have made Hotpoint the mark of *sterling* on electrical appliances in over 16,000,000 homes.

Here is a line you can sell. It's new and better from top to bottom — loaded with values that tug at the buyer's pocketbook.

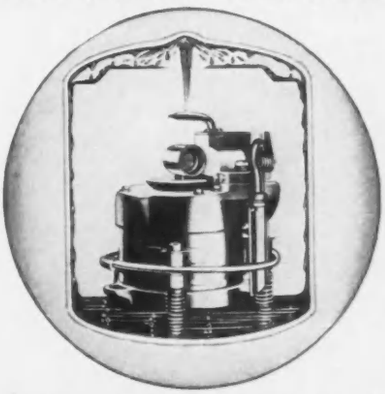
Call the Hotpoint distributor today. Get an early start to plus volume and sure profits. Ride with Hotpoint in 1937!

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc.
5600 West Taylor Street, Chicago, Illinois

EXCLUSIVE FEATURES THAT WILL MAKE 1937 THE BIGGEST YEAR IN HOTPOINT HISTORY!

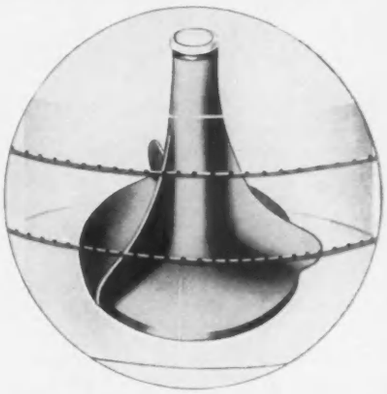


Faster Freezing at Lower Cost
The Hotpoint SPEED FREEZER
Ice and frozen desserts faster than ever before! Foods kept safe and crispy-fresh in a gently floating blanket of frosty air—air held at constant chill, regardless of freezing speed.



The Vacuum-Sealed Thriftmaster Delivers More Power at Lower Cost
Almost by magic a mere trickle of electricity is transformed into an abundance of freezing power. 5c worth of electricity makes twice as much cold as formerly. Lower operating cost

Hotpoint Calrod Speed Cooking
New Hi-speed Calrod cooks with amazing speed for a fraction of former cost. Rugged construction adds years of extra life. Speed cooking Calrod has arrived. Cash in with Hotpoint Calrod.



Hotpoint Thriftivator Washes Faster
Hotpoint's unique washing principle circulates clothes through 3 distinct zones of agitation. Sudsy water forced through every fibre. The Thriftivator washes more clothes faster.

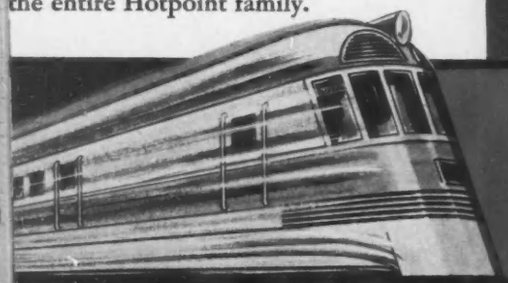
Ride with Hotpoint in 193

1937 WILL BE THE BIGGEST YEAR IN Hotpoint HISTORY

POWERFUL NATIONAL ADVERTISING SPEEDS UP SALES AND PROFITS!

FOR 30 years the Hotpoint name has blazoned across America in leading magazines, newspapers, and posters. The 1937 advertising program is the most consistent, intensive and compelling in our history. Every month throughout the year major publications blanket the best prospects in your territory with colorful and convincing messages that induce a constant stream of sales on the complete Hotpoint line.

And that's not all! Hotpoint supports you with a planned program of local newspaper and poster advertising to make your store appliance headquarters—to build volume sales at low cost. When you see this set-up you'll agree that 1937 will be the biggest year in history for the entire Hotpoint family.



HIGH SPEED SALES PROMOTION STREAKS THROUGH SALES RESISTANCE

Streamlined Direct Mail Fast-acting pieces in full color flash the amazing story of Hotpoint's exclusive features to selected prospects delivering a trainload of sales-making appeals aimed directly at the pocketbook.

Streamlined Displays Hotpoint has planned a whole series of dramatic, interest-building displays for your store and windows to make passers-by stop, look and listen. These displays link your store to the main line of traffic created by Hotpoint's national advertising.

Streamlined Sales Plans Hotpoint men are now equipped with the most comprehensive array of sales plans, training material, contest and sales ideas ever put behind a product. Call the Hotpoint distributor today. Ride with Hotpoint to the biggest year in history!

RIDE WITH HOTPOINT IN 1937

Call Your Hotpoint Distributor Today

RIDE WITH Hotpoint IN 1937!

• HERE are your local "Ticket Agents"—Hotpoint Distributors—who will show you how to build sales and profits this year. Call them today. They have a complete display of Hotpoint's 1937 appliances:

Los Angeles—

General Electric Supply Corp.
385 E. Second Street
Phone TRinity 8621

Fresno—

General Electric Supply Corp.
1117 "N" Street
Phone 3-1131

Portland—

Stubbs Electric Company
33 N. W. Park Avenue
Phone BRoadway 5404

Graybar Electric Company, Inc.
W. Park and Flanders Street
Phone BRoadway 1445

Seattle—

Graybar Electric Company, Inc.
King and Occidental Streets
Phone MAin 4635

San Diego—

General Electric Supply Corp.
206 W. Market Street
Phone MAin 6138

Spokane—

Graybar Electric Company, Inc.
152 S. Post Street
Phone Riverside 3151

Tacoma—

Home Electric Company
1316 "A" Street
Phone 9-3166

San Francisco—

Electric Kitchen Appliance Co.
560 Ninth Street
Phone HEmlock 8080

Phoenix—

General Electric Supply Corp.
441 W. Madison Street
Phone 3-3103

Salt Lake City—

Graybar Electric Company, Inc.
167 W. Second S. Street
Phone Wasatch 630

El Paso—

General Electric Supply Corp.
425 W. San Antonio Street
Phone Main 892

★ **Your HOTPOINT Distributor has the Story!** ★

PRINT IN BINDING

SETS A FASTER PACE FOR 1937

● It's full speed ahead as Frigidaire—already traveling faster than ever—greets the new year and the opportunities ahead with added power!

With a new selling strategy! With an enlarged schedule of packed-with-punch advertising—more dramatic and sales-compelling than ever! With a new product that incorporates many startling new features—including one that adds *so much* to the services of refrigeration that it will instantly capture the imagination of the buying public and start dealers talking from coast to coast!

Frigidaire Dealers in 1937 will have the most powerful program they have ever had. And be prepared for another record-breaking year!

Soon everyone will know the news. And Frigidaire men will be on their way to even greater success and profits!

FRIGIDAIRE DIVISION
General Motors Sales Corporation, Dayton, Ohio

FRIGIDAIRE
MADE ONLY BY GENERAL MOTORS

YOU'LL DO STILL BETTER WITH FRIGIDAIRE IN '37!

hese manufacturers

of nationally famous ranges, have selected CHROMALOX Super-Speed UNITS for 1937

ALL-OVER, METAL-TO-METAL CONTACT

With the bottom of the cooking vessel

•

TWO-BURNERS-IN-ONE

Selective heat to suit the size of the utensil

•

THE IDEAL FRYING UNIT

Outer burner only, for uniform frying heat

•

UNHARMED BY COOKING ACCIDENTS

Spill-overs drain harmlessly off — Rough handling causes no damage

•

EASILY CLEANED

Simply wipe the flat top with a damp cloth

THEY know that Chromalox Super-Speed units sell more ranges!

The Chromalox curve drives ever upward, impelled by the outstanding quality of Chromalox units . . . by the ever-growing demand of range buyers for these fast-cooking, power-saving, long-lived units on the ranges they buy . . .and by the enthusiastic appreciation of power companies and dealers, who know that Chromalox units not only sell ranges, but also cut the service problem to the irreducible minimum.

Sell Chromalox-equipped ranges and drive your sales curve upward by featuring the outstanding and unique Chromalox advantages, obtainable in the ranges listed.

EDWIN L. WIEGAND COMPANY
7540 Thomas Blvd. Pittsburgh, Pa.

Represented by
MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash. 61 Fremont St., San Francisco, Calif.
1501 N. W. Kearny St., Portland, Ore. 912 E. 3rd St., Los Angeles, Calif.

THE PETERSON COMPANY
1921 Blake St., Denver, Colo.

- A-B STOVE CO. — A-B
- ESTATE STOVE COMPANY — ESTATE
- KELVINATOR CORPORATION — KELVINATOR
- LANDERS, FRARY & CLARK — UNIVERSAL
- MALLEABLE IRON RANGE CO. — MONARCH
- NORGE CORPORATION — NORGE
- ROBERTS & MANDER STOVE CO. — QUALITY
- RUTENBER ELECTRIC CO., Inc. — MARION
- WALKER & PRATT MFG. CO. — CRAWFORD

"Chromalox-equipped ranges are superior ranges"

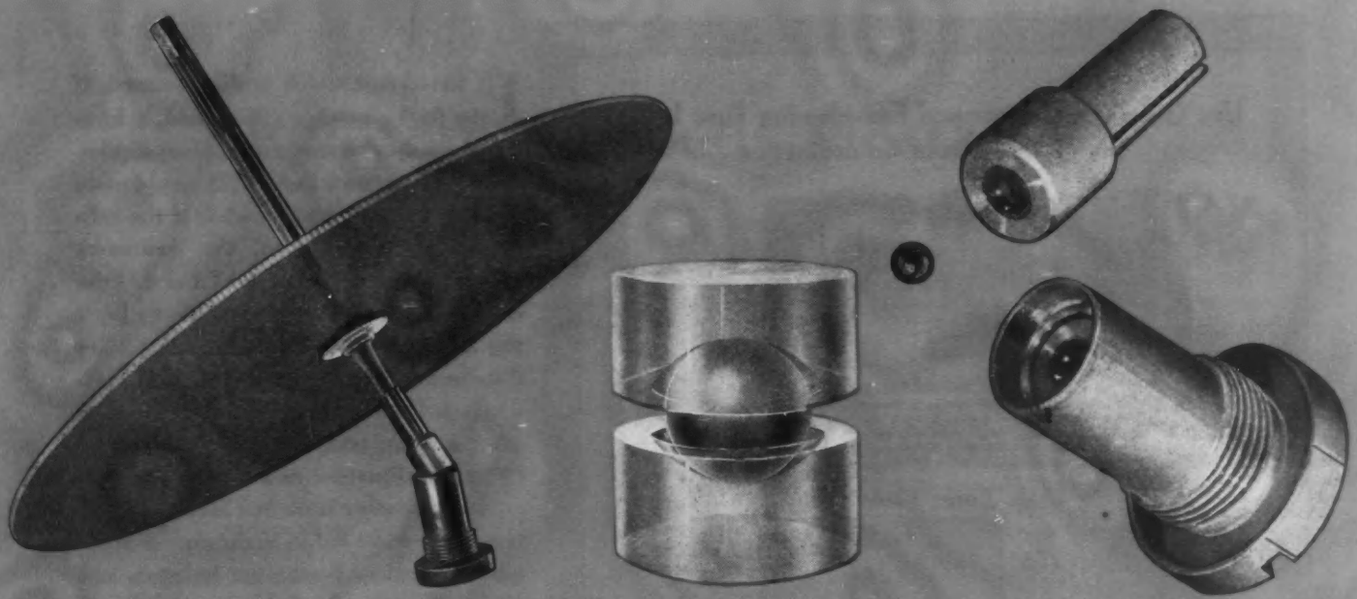
Specify CHROMALOX Super-Speed RANGE UNITS

THE METER *may change*

ELECTRICAL WORLD AND ENGINEER.
FEBRUARY 13, 1904.
Westinghous
Type A
Integrating Wattmeter
An improved form retaining all the well-known Westinghouse qualities, the changes consisting in the addition of new features adding to the permanency of calibration and ease of installation.
One of the features
Is the cup and ball bearing, in which the wear is distributed over the entire surface of the ball, reducing it to a negligible quantity.
The wear upon the jewels is also lessened, it being equally divided between two points of contact, instead of one, as in the old style of pivot bearing.
Westinghouse
Sales Offices in Every Large City

but...

NOT THE BEARING



IN 1901, Westinghouse invented the ball and double-jewel bearing. Since then, the watthour meter has undergone almost continuous improvement, but no better bearing could be devised. For thirty-five years this combination of a hardened steel ball and two sapphire jewels has been used in every Westinghouse watthour meter, single-phase or polyphase. Not even its style number, 25463, has been changed.

The longer a Westinghouse meter is in service, the more pronounced become the advantages of this bearing. Meter test sheets throughout the country definitely prove that it seldom if ever needs replacing.

Practically unaffected by wear or time and never requiring lubrication of any kind, experienced metermen find it a safe standard of comparison.

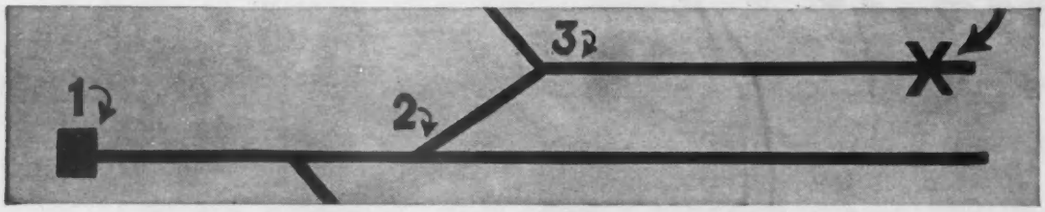
Westinghouse is more than ordinarily proud of this contribution to metering, and upon it places the reputation of Westinghouse watthour meters for unequalled sustained accuracy. J 40055

SINCE 1888

METERS INSTRUMENTS RELAYS

Westinghouse

IF YOU HAD A SHORT CIRCUIT HERE

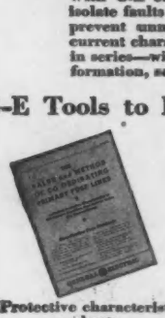


HOW MANY CUSTOMERS WOULD LOSE SERVICE?

Use G-E Fuse Cutouts and Fast-blowing Fuse Links for Best Results in Co-ordination

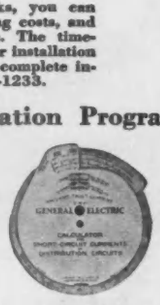
With G-E cutouts and fast-blowing fuse links, you can isolate faults to smaller areas, reduce re-fusing costs, and prevent unnecessary interruptions in service. The time-current characteristics of the links permit their installation in series—with smaller time differentials. For complete information, see Bulletins GEA-1994A and GES-1233.

G-E Tools to Help Your Co-ordination Program



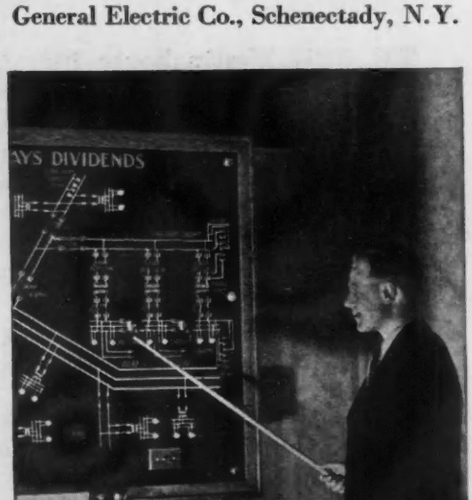
Protective characteristics charts

Total clearing time-current curves



Short-circuit calculator

IN the circuit which is diagrammed, if the feeder breaker (1) opened, a hundred or more customers would lose service. Fusing the branch line at (2) would more than halve this number, while if the sub-branch (3) were fused, the customers affected might be reduced to 3 or 4. Fuse co-ordination makes it possible to limit the number of customers affected by distribution faults, and hence pays dividends in service improvement. Here is what a prominent Eastern utility says: "The co-ordination of fuses at junction points with other fuses and breaker relays is an important aid in maintaining high-quality service. Faults are isolated, and their effect confined to small areas." General Electric Co., Schenectady, N.Y.



"WHEN up to 96 per cent of all consumer-minutes outages are a result of distribution faults, it behooves manufacturing and operating engineers to do something about it," says G. Fred Lincks, one of the men behind G-E distribution fuse cutouts. He is responsible for the developments that make possible closer co-ordination, the value of which he is demonstrating in the illustration, using actual fuse links. "Between 60 and 90 per cent of consumer-minutes outages," he says, "are caused by line faults, and the proper co-ordination of fuse sectionalizing offers a low-cost answer to this problem."

GENERAL ELECTRIC

ELECTRICAL WEST

Devoted to the economic production, transmission and distribution of electric power and its application to industry, commerce and the home in the Pacific Empire, and to the sale and distribution of electrical utilization devices, equipment and appliances in that area

January 1937

Ignorance Breeds Obstacles

By W. C. MULLENDORE*
Executive Vice-president, Southern California Edison Co., Ltd.

COOPERATION is one of the first laws of life in our modern world. Our entire economic scheme is built upon the theory that there will be teamwork in production, distribution and all economic activity. No one with even slight experience should be unaware of the fact that his life and that of his family is dependent upon the working cooperation of literally thousands of people whom he has never seen and does not know. Our complex exchange economy is built upon the division of work under which one individual performs only an infinitesimal part of the whole task which must be performed if he and his family are to be fed, clothed and sheltered. To the extent that there is division of work, and specialization in tasks, to that extent is each of us dependent upon others, and to that extent is cooperation in economic undertakings as a whole imperative.

Hence, no argument is required to convince us that cooperation is both desirable and essential. Yet, like so many other grand objectives in life—good morals, social security, social welfare and advancement, the more abundant life—every right-minded person is in favor of it, can agree that we cannot get along without it, but we find difficulty sometimes in achieving it. We must work together; we must be able to rely on the other fellow and he must be able to rely on us, or the mechanism of modern trade comes to a standstill. Why should we not, then, always have perfect teamwork?

*Extracts from an address presented at the James H. McGraw Award dinner for R. E. Fisher, San Francisco, December 11, 1936.

Mullendore speaking. Seated is Prof. Paul Cadman, who was toastmaster for the occasion

What are the obstacles to cooperation? (1) Lack of understanding—lack of vision, inability to see the picture as a whole; (2) lack of faith in our fellow-man, too great a sensitiveness to what we conceive to be our own narrow interest, or too great fear that the other fellow may get more than we do.

If I were asked today to select the one rock upon which the ship of civilization seems in most danger of foundering, I should name "Ignorance,"—ignorance of man's inter-dependence, ignorance of the fact that anyone who is carrying on a legitimate pursuit, who is doing useful work in the world is an ally of yours—that, even though a competitor, you cannot do him a serious injury without injuring yourself.

Distrust and suspicion are obstacles to cooperative effort. In other words, we must have confidence in our industry if we are to be good cooperators. Team play is nurtured in the soil of confidence—belief in our fellow players, belief that they are playing the game fairly and not attempting to claim all the applause or to gather an unjust share of the rewards for our common effort. But above all, we believe in the worthiness of the industry of which we are a part.

Not infrequently, I hear of members within the industry who have become the victims of the propaganda of its enemies. That is, they believe that most, if not all of the charges made against the industry are true. They accept as true the oft-repeated assertion of our detractors that we have only ourselves to thank for the suspicion and distrust which some sections of the public hold against us; that it is because of our misdeeds and our mistreatment of the public that the politicians find it profitable to belabor the utilities.

Now, we can understand the public being fooled but it is hard to excuse the members of our own industry who are taken in by such propoganda.

We ought to know our industry better than that. We ought to know that nine-tenths of this stuff is false and it is our duty to nail these lies wherever

and whenever we hear them. Neither can we excuse ourselves by saying that the facts should be made known. The facts have been told and retold by members of our industry. Not, it is true, as effectively as has the other story but that is largely because the truth is not as entertaining as the falsehood. In any event, the truth has been told so frequently that there is no excuse for anyone in the industry who is really interested not knowing the facts.

Facts Essential

We cannot have confidence in our industry unless we know the facts and we cannot know the facts unless we take the trouble to study them. We will not be good cooperators until we have restored our faith and confidence in our own family. With a united front presented by all who are members of this industry—a joint determination to see that the public shall no longer be victimized with the humbuggery of politically-inspired obstacles to the performance of the service we are prepared to render, we can move forward into a glorious advancement.

If you have ever lived on a farm, you know how hard a team will pull along towards evening when it is turned towards the barn. The horses have worked together all day but they exert a little more pressure on their collars when they know they are headed for their oats. I want to point out that there are some oats in the barn for the electrical industry and some further great opportunities for us to advance the American standard of living. I think that when we realize how good they are and how close they are we will need no urge to get our weight into the collar and all pull together.

Great Market

The present market for domestic electrical appliances in California amounts to $4,000,000 a month—almost $50,000,000 a year. No single agency in this field could have built such a market by itself—it is the result of cooperation. Fifty million dollars distributed among the branches of the industry means a lot of oats for everybody.

Ten year ago I might have said, "Gentlemen, there is a new device of which we know little and the public at large knows nothing and yet I predict that we will see the time when this appliance will bring us an annual sales volume of $35,000,000 and will yield the electric utilities of California an annual revenue of $4,000,000 for electricity consumed by a single year's sale of this appliance." If I had said that, my audience would have whispered, "There's a dreamer. What we need is practical men."

No doubt you have surmised that I am speaking of the electrical refrigerator—almost unknown ten years ago and now one of our greatest sources of revenue. Ten years ago the same words and virtually the same figures could have been used with reference to the radio. With what pride we should look upon those great contributions to the happiness, enjoyment and well-being of the family in the home!

Hence, I am led to ask, "What is our measure of the new sources of revenue which inevitably will come in to the picture during the next decade? What business will unfold as air-conditioning receives public acceptance? What will television bring? When will new light sources upset traditional methods and call for new equipment in untold amounts? What further additions can we make to the joy of living?"

These new things will come in the future as surely as they have come in the past. Somebody will get the business. But who gets the business and how much he gets and how great the value which our customers will receive depends to a notable degree upon the effective cooperation of all the men and organizations within our industry.

New Housing

An estimated housing shortage of $29,000,000,000 has developed during the last six years. These new homes should be more and more electric. Our industry's share in the building opportunity, measured in dollars, is one and one-half billion.

Despite our wonderful record in the sale of electrical appliances, the market has only been scratched. Experts estimate that there is sixteen billions of market available—at least there is that much need and potential demand—in the homes now wired for the appliances we have for sale.

While we are waiting for the new factories and new homes to be built, there is another outlet for our products which can be made to assume tremendous proportions within a few months of our decision to tackle it with a genuinely cooperative plan. In California, for example, there are 2,500,000 old structures, ranging all the way from a four-room cottage to a ten-story office building. All of these need electrical modernizing. We can safely say that each building will require at least as much as the original installation cost at the time of construction. If it cost $25 to wire the cottage, at least that much should now be spent to bring it up to date. If the wiring in a machine shop cost $300, probably that much should be appropriated now to modernize it. Then as soon as the wiring has been done, the way is open for new fixtures and equipment. Our opportunities are unlimited!

Now, of all the industries which are competing with us for a share in the consumer's purchasing power, we have the greatest value to offer for the consumer's dollar. That the consumer recognizes this is evidenced by the fact that today our industry is the only major industry which has exceeded all former records of output. We have the goods; we have the value; we are prepared to meet the demands and to serve the consumer. We need only that spirit of cooperation—cooperation from government by freedom from persecution—and teamwork amongst our fellows.

Team Work

In business life we must see the other fellow's point of view. We should recognize the other man's contributions to the cooperative effort, and recognizing this value be not only willing but anxious to give the other fellow full credit for his contribution. In that spirit, in that attitude, we shall find most if not all of the secret of cooperation. To be able to see the whole picture, to hold the proper perspective, not to insist on your pound of flesh or to exaggerate out of its due proportion the interest which you represent—such an attitude leads to team-work and, like many other virtues, its exercise on your part tends to encourage and to develop its exercise by others.

It is in the soil of such cooperation and team-work that the fruits of victory must grow.

Other industries are preparing to put forth united efforts in their endeavor to get the lion's share of the consumer's dollar. Regardless of what branch of our industry we are in, we are partners — partners whose interests are bound up with the future development of this young and growing and inspiring service.

Looking Forward

Let us make the joint determination that we will open our minds anew, revive our imaginations and renew our allegiance to the common cause. Let us forget the disappointments and the failures of the past, and think only of the glorious achievements and the splendid heritage which is ours. With confidence and faith in our industry, with belief in the fairness of our fellows in all walks of life, with optimism and with courage, we can do nought but succeed.

Bill Jones Speaks + + +

On the Universal Agent

DEAR MR. MANAGER: I am sorry that I didn't receive an invitation to attend the New Year's party to your employees. If, however, I had been there, I should have asked you to permit me to read a tribute to the "Universal Agent," which, to "my artless Japanese mind," is one of the best things ever written on the subject.

It was back in 1900. I was an officer of the Western Federation of Miners and I was sent as a representative from the local branch in Denver to Virginia City, Nevada. The occasion was the inauguration of electric power on the old Comstock. It seems that some San Francisco people—I think it was the Fleishhackers perhaps—had built some plants near the California state line. There was a great banquet; a special train from California; all of the bigwigs of the mining industry, the bankers, a whole flock of brokers and Congressmen and United States Senators galore. I never saw so many boiled shirts and so many stuffed shirts under one roof.

There were speeches and speeches and then some more speeches, but the one that amounted to something was delivered by a country newspaper editor, Sam P. Davis, of Carson and his name was not even on the program. And yet it is the only one which survived.

May 1937 tax the capacity of your power plants.

Sincerely yours,

BILL JONES.

P. S.—I enclose a copy of Sam's speech. You and the rest of the electrical industry should frame it and hang it on the wall.—B. J.

A Tribute to Electricity

BORN from nothing, it leaps into existence with the full-fledged strength of a giant, dies, is born again; lives a thousand lives and dies a thousand deaths in a single pulsating second of time.

¶ It soars to every height, plunges to every depth, and stretches its vast arms throughout illimitable space.

¶ It plants the first blush upon the cheek of dawn; with brush of gold upon the glowing canvas of the west, it tells the story of the dying day.

¶ At its mere whim and caprice, a thousand pillars of light leap from the dark and sullen seas which surge about the poles, while from its shimmering loom it weaves the opalescent tapestry of the aurora to hang against the black background of the Arctic night.

¶ It rouses Nature from her winter sleep, breaks the icy fetters of the frost that binds the streams, lifts the shroud of snow from off the landscape, woos the tender mold and bids the birth of bud and blossom; dowers the flower with perfume and clothes the earth with verdure of the Spring.

¶ It rides the swift courses of the storms that circle round the bald crest of old Mount Davidson; cleaves the black curtain of the night with simitar of flame, rouses the lightnings from their couch of clouds and wakes the earthquake.

¶ Beneath its touch, the beetling crag, which took omnipotence a thousand years to rear, crumbles into dust, the mere plaything of the idle wind; it lays its hand upon the populous city with its teeming, restless multitude, and yesterday where stood the glittering spire, the shining tower, the frowning battlement, today the cold gray ocean rolls in undisputed might.

¶ It gathers the doings of the day from the four corners of the world, the tales of love and death, of fire and flood, of strife and pestilence, and, under eight thousand miles of shivering sea, whispers the babble of two hemispheres.

¶ It turns the wheels of peace where poor men toil, and helps the husbandman to plow and plant and reap his whispering grain.

¶ It rides the wings of war where brave men die, and when it stalks between contending hosts, exalts the kingly crest and helps an empire plant its flag of conquest.

¶ It glows in lonely attics where weary workers toil to earn their crust. It shines o'er scenes where feet of feasters tread the halls of revelry. It lights the mourners on their pathway to the tomb. It glares in haunts where jeweled fingers lift the cup of pleasure to the mouth of sin, 'mid the sobbing of sensuous music and flow of forbidden wine; and speeding on its way illumines the dim cathedral aisle, where surpliced priest proclaims the teachings of the Master and golden-throated choirs lift their hosannas to the King of Kings.

¶ It was the Maker's ally at the dawn of time, and when God from the depths of infinite space said "Let there be light," it sent the pulse of life along creation's veins, baptized earth's cold brow with floods of fire, and stood the sponsor of a cradled world.

—Sam P. Davis, 1900.

Survey of Farm Use of Electricity in Hood River Valley

A SURVEY of the use of power by 944 customers in the Hood River Valley, Oregon served by Pacific Power & Light Co., reveals some illuminating facts on the kind of appliances used on farms and on the relation of customer investment in converting devices to consumption. This survey was made by Alva L. Day rural representative of the company, as of the end of 1935, and was reported in the September-October issue of the Pacific Power & Light Co. *Bulletin.*

The 944 customers used 3,007 converting devices beside lighting, resulting in an average use per farm in 1935 of 1,130 kw.-hr. The 3,007 converting devices represented a customer investment of approximately $297,000. Estimated average cost for wiring and lighting fixtures of $134 per farm added $126,496, making the total investment of the customers about $423,500, or an average of nearly $450 per farm.

Customer Investment

Several sporadic attempts have been made to establish what the relationship may be between customer investment and use, notably in a report for the Northwest Electric Light and Power Association by D. B. Leonard, Pacific Power & Light Co., (ELECTRICAL WEST, June 1936, page 89). Obviously this can never be a constant relationship holding good for all groups in all localities. It will vary for any group with the cost of appliances in the locality, and with the average volume of use made by the group. Even the characteristics of curves plotting average use against investment in the case of rural groups will vary with the kind of use made of the power as determined by the kind of farming predominantly carried on in the locality.

Thus the casual reader should not consider the facts contained in this survey to be applicable to other groups in other localities. Nevertheless this survey does add this to the estimates, facts and theories thus far produced on the subject: namely, that this group of nearly 1,000 horticulturists, poultrymen and dairymen, in their present stage of electrical development, have 40c invested for every kw-hr. they use annually. It is interesting to note further that the average annual bill for service per farm of $41.45 (average cost per kw.-hr., 3.66c) is less than one-tenth of the customer's investment.

Local Factors

Hood River Valley is primarily an apple and small fruit raising area and is fairly thickly settled. Some of the earliest experiments in rural electrification in the Northwest and perhaps in the United States were tried there, the first line having been built in July 1906 to serve five customers. Among these was E. H. Shepherd, founder and publisher of *Better Fruit Magazine*, who designed and built the first apple grader used in the Valley and desired to power it with an electric motor. The development of power graders from that time on proved to be an impetus to the construction of farm lines, eventually leading to a substantial coverage.

The 944 farms receiving electric service there in 1935 constituted 83.9 per cent of the total number of farms in Hood River County. The customers are served from about 175 miles of line indicating an average concentration of 5.4 customers to the mile. Diversification in recent years has added dairying and poultry raising to the farming activities of the valley so that other power loads than apple grading and washing could be developed. Irrigation is carried on largely through gravity systems so that irrigation pumping is not a major factor in the electrification program.

Tabulations

The attached table summarizing the survey lists the number of devices used and their estimated cost. Added, in the case of some of the major household appliances, is the percentage saturation. Among the appliances radio is well out in front with 96.2 per cent. Mr. Day points out that while the radio may be considered a luxury it nevertheless has its business value through bringing agricultural information and price quotations. In fact all the domestic appliances have a favorable influence on the net income of the farm, he contends, since these time and energy savers release the time of the house wife for farm chores which she frequently shares with the men folks. These chores include helping in the dairy, tending poultry, helping in the packing house during harvest, and preparing meals for hired help, all of which tend to keep down the cost of production.

Table I—Equipment Used by 944 Electrified Farms in Hood River Valley

Number in Service	Equipment	Average Cost Per Unit	Total Cost to Farmers for Electrical Appliances	Per Cent Saturation
138	Ranges	$110.00	$ 15,180.00	14.6
156	Refrigerators	160.00	24,960.00	16.5
778	Washers	60.00	46,680.00	82.5
38	Ironers	40.00	1,520.00	4.0
113	Water Heaters	60.00	6,780.00	12.0
912	Radios	65.00	59,280.00	96.2
4	Dishwashers	200.00	800.00	
211	Farm Motors	50.00	10,550.00	
27	Irrigation Pumps	250.00	6,750.00	
142	Water Systems	100.00	14,200.00	
2	Hotbeds	12.00	24.00	
86	Yard Lights	4.50	387.00	
12	Stationary Sprayers	750.00	9,000.00	
112	Apple Graders	400.00	44,800.00	
67	Apple Washers	600.00	40,200.00	
30	Milking Machines	250.00	7,500.00	
1	Dairy Sterilizer	175.00	175.00	
5	Water Heaters	70.00	350.00	
1	Dairy Cold Room	400.00	400.00	
39	Cream Separators	100.00	3,900.00	
39	Brooders	20.00	780.00	
22	Incubators	50.00	1,100.00	
66	Poultry House Lights	25.00	1,650.00	
6	Poultry Water Warmers	3.00	18.00	
3007			$296,894.00	

Nursery Speeds Propagation With Soil Heating Cable

EFFECTIVELY utilizing electric soil heating, Mrs. Eleanor Wepper has more than 800 types of fine begonias under cultivation in her nursery at Inglewood, Calif. Many are new varieties developed by Mrs. Wepper.

Plants are propagated in an electrically heated bed 26 ft. long and 3 ft. 9 in. wide. Soil heating cables 160 ft. in length warm the soil to the desired temperature. Thermostatic control is utilized. Recommendations of the rural eelctrification department engineers of the Southern California Edison Co. were followed in planning the installation.

A valuable saving in propagation time is accomplished by heating the soil with electricity. Tuberous begonias mature two months sooner than when raised by ordinary methods. Seed begonias require only 6 days with soil heating, while 17 days formerly were required.

An astonishing reduction in the time required to propagate St. Paulies violets has been made with soil heating. This work also has been carried on at the Wepper Nursery. These unusual violets, which originally came from South America, require all winter to mature under ordinary conditions. With electric heat, they mature in 20 days.

One of the electrically heated begonia beds at the Wepper Nursery in Inglewood, Mrs. Wepper at left. Across the top can be seen the vent for the now obsolete warming system

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Artificial Light Makes Pecans Fatter

Pecan growers in the Yuma, Ariz., district are exhibiting interest in studies at the State Experimental Farm where artificial light is being used to stimulate the growth of pecans. A representative of the farm explains the theory as follows:

"Through their roots, plants obtain minerals which are necessary for healthy growth, and from the air they obtain carbon dioxide which combines with water and the minerals from the soil to form the fat of pecan kernels.

"It is only in the presence of light that they can utilize the carbon dioxide gas, and in order to increase the fat content of Yuma Valley pecans, we have used artificial light at night, which lengthens the time during which fats can be formed by the trees.

"The matter of light is a very important one, especially in the older orchards where there is such intense shade that the nuts are not filling out properly."

• ELECTRICAL USES ON THE FARM were featured chiefly by the Puget Sound Power & Light Co. at the Western Washington Fair held at Puyallup recently. The exhibit occupied a large section of the electric building. Supervised by John Scott and Glenn Cushing and participated in by Tom Fulford, Ed Ross, Ted Bakeman, Edith Rauch and Eva Claire Kirkwood, the exhibit illustrated a complete electric service to the farm both in the agricultural and in the domestic applications. A graphic picture of how over 90 per cent of the rural customers enjoy service in nineteen counties served by the company and that in that territory one-cent electricity is uniformly available after 240 kw-hr. use proved particularly interesting to the visiting farmers.

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Portable Exhibit For Small Fairs

To provide adequate and complete displays of electrical equipment adaptable to farming applications at the smaller country fairs throughout the state the Agricultural Extension Division of Oregon State College prepared a portable exhibit which was used extensively during the fall months. A trailer coach (formerly employed as a G-E traveling kitchen) was equipped with electrically operated apparatus employed in farm enterprises as well as appliances used in the home.

A total of 33,000 people at three county fairs and the state fair visited the exhibit. On display was a 5-hp. portable motor, a direct connected motor driven irrigation pump, a miniature deep well pump, a shallow well water system, samples of irrigation pipe and revolving sprinklers, a motor driven hammer mill, a green feed chopper adapted for electric drive, an electrically operated egg cleaner, an egg room humidifier, a kit for constructing an underheat brooder, an automatic timer for poultry house lights, a poultry water heater, a soil heating kit for constructing a hotbed, an electric fly trap and a small portable motor.

Of particular interest was a cost meter which demonstrated the operating cost of the commoner types of domestic appliances.

The coach was equipped with a canvas marquee so that part of the exhibit could be set up outdoors. Lists of bulletins on subjects pertaining to rural electrification were available together with space for the name and address of the person interested in receiving them. The bulletins were sent out from the college later.

●

Conference to Discuss Farm Electrification

Newest developments in rural electrification will feature the program of the three-day rural electric conference sponsored by the California C.R.E.A. to be held at the University of California, Davis, Jan. 11-13. Conducted primarily for agricultural power salesmen of the utilities, the course is open to anyone interested in the application of electric power to modern farming.

Lectures and discussions will include such subjects as walnut and prune dehydrators, use of artificial light in greenhouses, air conditioning, milk cooling, economic limits of electric pumping, electric pig brooders, underheat electric brooders, dairy sterilizers, growing crops out of season with electric heat, electric fences, electric insect traps, equipment for handling feed molasses and types of lighting equipment particularly adapted to the farm. There will also be a demonstration of an electric tractor.

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• ELECTRIC BROODING, on the decline from 1933 to 1935, is again on the uptrend, according to Pacific Gas & Electric Co., which reports distinct improvement in connections of brooders and incubators during 1936. The North Bay division reported more than 650 connections.

Cooperation on Parade + + +

[*Forecast of forthcoming cooperative merchandising activities, and review of activities in progress or completed, a summary of cooperation at work throughout the West*]

When it comes to crowds, San Diego packs them in for its annual shows. This was the crowd on the final night. It established a new record attendance and a new high sales record

Christmas Appliance Show Tops

THOUGH all expected great success for the 4th annual Electrical Show of the Bureau of Radio and Electrical Appliances of San Diego County, they were not prepared for the tremendous public enthusiasm which surprised even the most optimistic forecasters. The show was held Nov. 28 to Dec. 2 amid the beautiful surroundings of Balboa Park exposition grounds.

Timed to strike the Christmas buying season at its very beginning, the show was opened to a huge crowd Saturday night following Thanksgiving. Attendance continued to grow until Wednesday, the closing night, when the entire building was packed for more than three hours. Sunday, operating all afternoon and evening, proved to have the heaviest attendance. From door counts at frequent intervals a conservative estimate numbered visitors during the five days at 86,000.

Sales results and enthusiasm likewise were the best on record. Isolated examples of exceptional business were mentioned by J. Clark Chamberlain, managing director of the Bureau. One exhibitor sold $1,656 worth of refrigerators from the floor besides other products on display. A sewing machine exhibit closed fifteen sales for a total of $1,688.87. Dealers selling from one distributor's space sold more than $3,000 worth of equipment.

To publicize the event and make it absolutely the center of all San Diego County activity for the week an opening broadside of advertising appeared on Thanksgiving day. It was followed Friday evening and Saturday morning by special sections of the local papers. Radio broadcasting from both local stations was utilized.

A unique publicity stunt was the lighting of a half-mile of trees through Balboa Park, from the Laurel St. entrance to the Better Housing Building, in which the show was held. This lighting was continued after the show until New Years. It was sponsored by the San Diego Consolidated Gas & Electric Co., the Park Board of the city and the Bureau.

Entertainment featured nightly radio broadcasts from the stage at 7 o'clock followed by floor shows and a prize drawing at 9:30. In the afternoon program music was offered those who wished to sit and listen. Daily prize drawings were held at 4 p.m.

Attention-getting and non-commercial exhibits were staged and proved to be sensational. Among these was the world's smallest broadcast station, WEE. An excellent Better Light-Better Sight exhibit was staged and drew large crowds. The city electrical inspection department displayed the safety exhibit of the Southwestern Section, I.A.E.I. Radio technicians had an exhibit as did theater and motion picture equipment manufacturers. An increase in number of exhibits from 37 to 48 this year of-

Straight through Balboa Park, scene of America's Exposition last year, a street flanked on both sides by lighted Christmas trees led to the 4th annual electrical show of the Bureau of Radio and Electrical Appliances of San Diego county

fered visitors a much broader scope. It was said that electric range interest was amazing and that seven or more ranges were sold from the fair. This is worthy of note; because of gas properties the local utility does not push electric ranges in its gas territory.

"It will be difficult to prove, but in my opinion," said Mr. Chamberlain, "these annual shows are the greatest factor in making San Diego County the heaviest appliance buying district per wired home of any that we know of."

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Electric County Fair Held in Los Angeles

Light and power under the "big top" characterized Los Angeles County's annual fair this year at Pomona, Calif. An 800-ft. chandelier, reputedly the longest ever built, was a spectacular feature. Extending the length of the ceiling in the main exhibit building, the enormous chandelier, made of celloglass, was 10 ft. wide and used ninety-six 500-watt lamps.

The most modern uses of electricity in the home and on the farm were the subjects of the elaborate Southern California Edison Company exhibits.

Lighting and kitchen appliances were cleverly combined in the home exhibit. Entrance to the display was made through a visual clinic sponsored by the Western Institute of Light and Vision, in cooperation with the Optometrical Assn. of Southern California. Each station in the clinic was presided over by a registered optometrist, who gave each visitor a free test of visual acuity, judgment of distance, binocular coordination, visual field and color vision. The value of good lighting in relation to vision was shown when each person was given an opportunity to read under varying intensities of light, with subsequent selection of the quality preferred—which in the majority of cases was several times that existing in their homes.

The exit to this exhibit was through a well-lighted living room and an attractive all-electric kitchen.

Electricity on the farm was spotlighted in the other Edison exhibit. A large pool into which turbine type pumps discharged water, with a submersible pump operating in the center, created the effect of a massive fountain. Under-water lighting in colors was used to enhance the effect.

Other pieces of electrical equipment for farm use, including farm refrigerators, milk coolers and aerators, dairy sterilizers, milking machines, brooders, incubators, pressure pumps and soil heating equipment, were shown in the remainder of the farm display.

At the Los Angeles County Fair—top, the Edison Company's home exhibit of lighting and kitchen appliances; center, one of the Optometrical Assn.'s vision testing stations; bottom, part of the large display of electrical equipment in the showing for farmers

Take Radio Studio Show to Small Towns

HOW to do a good job effectively promoting radio dealer sales is a problem that has worried many an electric utility company. Merchandising radio sets is not a part of the program of most utilities, even those which merdise other appliances. Radio is an item largely left to dealers to whom it represents a high dollar volume. But because radio sets also build mighty desirable load, every electric company is interested in furthering dealer sales and customer use.

If dealer enthusiasm and increasing sales of radio sets be any criterion, then Pacific Power & Light Co. seems to have found in its annual radio shows at least a partial solution to this promotional problem. The idea for these shows was developed by the Portland office of McCann-Erickson, Inc., the company's advertising agency, under whose direction the annual shows are staged.

Credit for the radio idea is given Vernon R. Churchill, Portland manager for McCann-Erickson, Inc. He claims his staff is entitled to all the orchids. In discussing this promotional scheme which has so definitely clicked, Churchill had this to say:

"The idea of a radio show was conceived in 1935. A trial of the idea that year proved so successful that this year it became a very sizeable undertaking.

"Pacific Power and Light Co. operates in southeastern Washington, eastern Oregon and also in Clatsop County on the Oregon coast. Service to approximately 10,000 rural customers and 125 cities and towns is handled through thirteen district offices. Largest city on the system is Yakima, Wash., and most of the communities served have a population of less than 3,000.

"The company does not merchandise radio sets and the furtherance of sales of all electrical appliances through dealers is a fundamental of its merchandising policy.

"When we began to plan how the company could advertise to stimulate public interest in radio sets, there were a lot of things to consider, including present saturation of radios, number of dealers on the system and the aggressiveness of these dealers in promoting their own sales.

"The obvious first suggestion was to release a series of advertisements glorifying the cultural or entertainment values of the radio or selling the idea of a second radio set. However, it seemed to us that this kind of advertising would only have the net result of saying 'Hurrah for radio.' It would be wasteful and ineffective because it wouldn't create specific interest in new radio sets. On the other hand it was equally obvious that Pacific Power and Light Co. could not run a series of advertisements discussing the latest developments in radio sets because immediately it would have found itself in the uncomfortable middle of a hotly competitive sales battle.

Birth of the Idea

"We decided that if we could do something to bring the public in to look at the new radios, the dealers would be encouraged to advertise their own sets and to further their own sales efforts. A radio show was the natural development.

"The next question was what to do to get people to come to the show. Certain it was that just an exhibition of radio sets would not draw any particular crowd in any of the towns on the system. Further investigation showed us that most of the people served by the company had never been inside a radio station, had never seen a radio program broadcast and were interested in seeing radio performers in person. This investigation gave us the clue for the feature of the show which was to build up the attendance. When we announced that there would be a radio show in any town, we invited the public to come and see experienced radio performers 'broadcast' a show as it would be broadcast from a radio station. Naturally, actual broadcasting was impossible, but the only essential difference was that a public address system was substituted for the radio station. Everything else was done as closely as possible as it would have been done in a radio station.

Entertainment

"For our 1936 shows, we used a troupe of Hawaiians, with extensive stage and radio experience and capable of solo and ensemble numbers. Our announcer was also an experienced radio master of ceremonies and an able showman. Performances were a half hour in length and each followed a script prepared as though for broadcast over an actual station. Usually there was one show in the afternoon and two in the evening.

"In each town where a show was scheduled it was publicized in a number of ways. Newspaper advertising was used, of course. The first announcement was made about fifteen days previous to the show. In some places, handbills were distributed and in smaller towns telephone announcements were effective. Radio spots were used in the three cities having radio stations.

"A special Hawaiian education program was worked out for our Hawaiians. Presented before school assemblies the day of the show, it proved a very effective method of promoting attendance.

"So much for the background. Now let us look at the results. This year we gave shows in fifteen towns, ranging from Waitsburg with 850 people to Yakima with over 25,000. In Walla Walla, Astoria and Yakima the event was a two-day affair. Other shows were given in Dayton, Waitsburg, Pomeroy, Sunnyside, Prosser, Grandview, Pasco-Kennewick, Goldenstate, Wash., and Pendelton, Bend, The Dalles and Hood River, Oregon. More than 16,000 people attended. Particularly did interest run high in the smaller towns.

"Seventy-nine dealers exhibited sets. This was 99 per cent of all dealers in towns where shows were held. Every dealer was enthusiastic over the results. Most of them closed sales during the show and all got lists of live prospects.

"Dealers were charged nothing for

How the dealers converted the sides of the hall in Yakima into a radio show is seen in this picture. Other towns did likewise. Thus the personal appearance of the radio stars was converted to attention towards the new radio sets

participation. Pacific Power and Light Co. furnished the place, the advertising of the show, and the entertainment. Dealers stood the expense of setting up and maintaining their own displays and their tie-up advertising. In some places dealers also gave prizes.

"In planning the shows, advance information was given all distributors of radio sets. Several of them had representatives make the round of the shows carrying complete lines of new

FREE!

"1937 Radio Show"

featuring the personal appearance of

Stars of Stage * Screen * Radio

Absolutely no charge to see the colorful, unusual, fast-moving Hawaiian entertainment!

☆ Starring the "Royal Hawaiians," well-known favorites of stage, screen and radio, this big show is something you and every member of your family should see. And for the first time, in one convenient place you will have an opportunity to inspect the beautiful, new, improved 1937 radios. Be sure to come! Every radio dealer in town invites you!

XYZ HALL BLANK CITY Monday, Oct. 5

Shows start at 4:00 p.m. – 7:30 p.m. – 9:30 p.m.

Sponsored by the following radio dealers and the Pacific Power & Light Company

Blank Radio Company Zenith, Inc. General Radio Supply

Typical ad, such as was used to announce the traveling radio troup to the public. In each case the hall was a local auditorium, and the names of participating dealers were run at the bottom of the advertisement

models. This made it possible for even the smallest dealers, who were not able to carry so large an inventory, to have a complete exhibit. Distributors also cooperated with dealers in newspaper advertising. In every town there was special advertising in the issue of the local paper closest to the opening of the show. This was done according to a prearranged plan which developed considerable extra space for the newspapers and encouraged them to give to the show the publicity which it needed.

"A feature of every show, appreciated by dealers and public alike, was a display by E. Van Atta, radio interference engineer for the utility. Mr. Van Atta showed many of the simple things which interfere with radio reception and explained how to eliminate them.

"Public response to the shows was excellent. People liked the entertainment and P.P.&L. representatives received many commendatory expressions. Particularly did people take a real interest in the new sets. Sales during the shows and subsequent to them, and the enthusiasm with which dealers are merchandising sets, indicate that for the utility the promotion was a successful new business undertaking."

Industry Assembles for McGraw Presentation

Celebrating the recognition bestowed on western cooperative enterprise in the electrical industry, by the James H. McGraw Award Committee, 400 leaders of the industry gathered for dinner at the Fairmont Hotel, San Francisco, Dec. 11. The annual award, which for the third time since its establishment singled out the West, was presented to R. E. Fisher, vice-president in charge of public relations for the Pacific Gas & Electric Co., honoring a region where harmonious trade relations have made possible a finer public service.

The event was a fitting one at which to review a record of electrical progress in the territory, which began in 1918, when the California Electrical Cooperative Campaign was organized. Presiding at the testimonial dinner was Paul Cadman, professor of economics at the University of California.

Cooperation as a necessity in today's economy and a thing which, by its nature, must be jointly undertaken, was discussed by W. C. Mullendore, executive vice-president of the Southern California Edison Co., Ltd., and principal speaker of the evening.

In making the award, a gold medal and purse of $100, R. A. Balzari, president of the McGraw-Hill Co. of California, emphasized the intent of James H. McGraw to provide an emblem which would stimulate the building of a vital industry. Reading the citation to Mr. Fisher, he said:

"In 1933 his company fostered the organization of the Electric Appliance Society of Northern California and gradually, by the persistent and cumulative influence of its fine example and unselfish devotion to the improvement of trade conditions, has brought great benefit to the electrical industry. This society has coordinated the advertising and promotion of manufacturers, wholesalers, dealers and utilities and greatly increased its volume and effectiveness. His company has united more than eight hundred dealers in a regular program of reporting monthly sales, to increase the market knowledge of the industry. It has helped accelerate the growth of the electrical business, by inspiring and guiding the conduct of a continuing series of coordinated seasonal promotion campaigns that have made selling history, year after year, throughout this area. This has created a high degree of harmony among these electrical men."

In response, Mr. Fisher disclaimed personal credit, stating he preferred to consider himself the symbol through which tribute was paid to the achievements and cooperation of the thousands of electrical men and women in the territory.

Industry cooperation in the far West received honors in the McGraw - Award - Committee citation, here being read to R. E. Fisher, left, by R. A. Balzari

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Kitchen Modernizing Bureaus Grow

Kitchen Modernizing Bureaus are now established and in active operation in 52 cities from New England to the Pacific Coast, the National Kitchen Modernizing Bureau announces. First steps toward the definite establishment of new Bureaus have been taken in 27 other cities, while in a large number of additional communities kitchen modernizing programs are being carried on without the organization of formal Bureaus.

Since the early part of the year, 131 cities have been visited by field representatives of the National Kitchen Modernizing Bureau. Three field men now divide this activity between them, but the Bureau's Executive Committee has recommended that the number be increased in the near future.

Western cities where Kitchen Modernizing Bureaus have already been established, with its chairman and the sponsoring organization, are as follows: Los Angeles, Calif., W. L. Frost, Southern Calif. Edison Co.; Denver, Colo., J. T. Coatsworth, Public Service Co. of Colorado; Grand Junction, Colo., R. B. Kearl, Public Service Co. of Colorado; Pueblo, Colo., D. Harrigan, Southern Colo. Power Co.; Trinidad, Colo., W. Bennett, Trinidad Elec. Trans. Ry. & Gas Co.; Santa Fe., N. M., J. E. Flynn, New Mexico Power Co.; Portland, Ore., A. C. McMicken, Portland Gas & Electric Co.; Salt Lake City, Utah, J. F. McAllister, Utah Light & Power Co.; Seattle, Bellingham, Bremerton, Chehalis, Everett, Olympia, Wenatchee, Wash., T. D. Fulford, Puget Sound Power & Light Co.; Spokane, Wash., R. B. McElroy, Washington Water Power Co.

Inspectors Make Available Booklet on Home Safety

That the public is far more interested in the safe and convenient use of electricity in the home than is generally recognized by the industry has been proved by the tremendous response evoked by a booklet which tells householders how to use their electrical equipment safely. Printed by the public relations committee of the International Assn. of Electrical Inspectors, the booklet has just been released for distribution by the trade to the public.

Requests from schools wishing to place pamphlets in the homes of students, have created such a demand that the committee is up against a financial problem in furnishing sufficient copies for distribution.

The inspectors in preparing this booklet had in mind that application of the National Electrical Code and local ordinances, the use of approved materials and the services of the inspection departments combine to insure reasonable safety for the permanent electrical installation in the house, yet after the occupants move in these precautions are often nullified.

Sometimes through carelessness, but most often through ignorance, householders use non-standard and hazardous equipment, fail to keep appliances in proper repair, devise makeshift extensions and make unskilled repairs to wiring and appliances.

Feeling that the trouble lies in a lack of knowledge on the fundamental principles of electrical safety, this booklet, completely illustrated and written in very simple language, fills a long felt need. Plans are under way to place a large printing order and thus obtain a low unit price for publication so that interested groups may distribute them at cost.

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Streamline Slogan for S. F. Market Week

Determined to make its last semi-annual Market Week at its present building at 180 New Montgomery St., one of the best, the Western Furniture Exchange is busy with plans. "Streamlining Progress" is the timely slogan to be featured throughout the market, Feb. 1-6. Streamlining, it is pointed out, reduces resistance and promotes progress. Streamlined merchandise and sales methods reduce sales resistance and promote more sales. With improvement in business, the largest group of dealers and buyers ever to attend West Coast market is expected by Manager Cameron Ball.

Of interest to electrical dealers and departments, will be the radio and appliance showing. Models of 1937 merchandise from a larger number of manufacturers and distributors will be featured. Likewise, the semi-annual radio and appliance trade dinner and entertainment will be staged on the Wednesday night of the week's market, for which entertainment of a novel order and merchandising talks by prominent members of the industry are being programmed.

Lamps and giftwares will also find interest among electrical dealers, and details of the new Western Furniture Exchange and Merchandise Mart, now under construction at Market and Tenth Sts., San Francisco, will be announced.

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Westerner Wins National Window Display Contest

Ott Hardware Co., Santa Barbara, Calif., was first prize winner in the dealer class for the Electric Buffet Service Month window and interior display contest, conducted nationally. An unusual window display embodying the campaign's posters, won for Ott Hardware the $100 prize.

Honorable mention in the utility class went to Utah Power & Light Co., Salt Lake City. John Evans, art director, designed the attractive and modernistc window. Winners of the Christmas Electrical Week windows will be announced soon.

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• DEALERS IN WESTERN COLORADO were afforded a series of sales meetings by the Western Colorado Power Co. just before the Christmas season. Miss Helen Hick conducted lighting demonstrations with new I.E.S. lamp. Miss Pulliam demonstrated small appliances and described advantages of their use. Meetings were held in Paonia, Delta, Montrose, Ouray and Durango, Colo. Baldwin, director, dealer coordination department, Utah Power & Light Co., and R. R. Rowell, General Electric Supply Co., also attended the meetings, giving talks on appliance opportunities.

●

• ELECTRIC KITCHEN folders and booklets for consumers are offered the industry on attractive terms by the National Kitchen Modernizing Bureau, 420 Lexington Ave., New York City. Two small folders entitled "For a Healthy Family . . A Wholesome Kitchen" and "An Electric Kitchen is a Happy Kitchen" are designed as envelope stuffers or for distribution at fairs or expositions. "Let's Talk About Electric Kitchens" is a 16-page, attractively illustrated, three-color booklet for distribution to serious prospects. Special prices are offered on quantities.

Rocky Area Expositions Score Success

Culminating eleven months of intensive business building, electrical appliance and lighting expositions last month were held in key cities throughout territories covered by the Electrical League of Colorado and the Rocky Mountain Electrical Assn.

In Denver alone, crowds totalling 15,000 attended during the 5 days, Dec. 1 to 5, and coupons from free admission tickets disclosed prospective customers with potential patronage estimated to exceed $500,000.

Common feature of the expositions held in Colorado, Wyoming, New Mexico, Nebraska, Montana and South Dakota, were mince-pie baking contests, in which girls and women, cooking with electric roasters, vied for prizes.

Typical exposition was that at Denver, where the *Denver Post* gave a $25 award for the best pie baked. Electric roasters went to second place and to the oldest and youngest contestants, while third prize was an I.E.S. lamp. In addition, a radio and I.E.S. lamp were awarded daily to a lucky visitor.

Admission was free, and the pie-baking, carried on from noon to 4 and 7 to 10 p. m., attracted throngs. Four contestants, each operating a different type of roaster—Nesco, EverHot, Universal and Westinghouse—baked simultaneously, following brief instruction in the art of electric cookery.

Despite the fact that no soliciting was done, one alert exhibitor sold 25 roasters within an hour.

A highway lighting exhibit, household lighting devices dating back to 600 B.C., continuous electric organ recitals, trick window displays, Baron Q, Hollywood pantomimist, free samples of electrically cooked meat and coffee, and creamy, colored concoctions, stirred with an electric mixer, were among other attractions.

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New L. A. Bureau Office Displays Dealer Appliances

With dealer and distributor displays of electrical appliances and an all-electric kitchen, a new branch office of the Municipal Department of Water & Power at Vermont Ave. and 59th Place, Los Angeles, was opened for business recently. T. B. Russell, district and branch office supervisor, is in charge. Attractively finished in modernistic treatment, both of lighting and of interior furnishings, the main floor, where bills are paid and service applications made, is surrounded by electric ranges displayed by cooperating dealers and distributors. At the rear a door opens into a model all-electric kitchen where customers are taken to witness demonstrations.

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An Easy Everyday Store Method

SIMPLEST and easiest of demonstration methods are what the dealer or salesman needs most often. For the advertised demonstration, conducted by the home economist or demonstrator from the factory, or arranged by the manufacturer's agent, there is an excellent demonstration plan available. Ask your wholesaler for it. Make use of it whenever you can.

●

BUT FOR EVERYDAY, quick and easy store demonstration without a lot of fuss, you need something simple and inexpensive. One very successful appliance manager has found these to be effective, clean, and easy to use. Try them.

●

TRY THESE to demonstrate thorough mixer action, and speed control:

ELECTRICAL WEST COOPEPATIVE

APPLIANCE SALES GUIDE

Copyright 1936 by Electrical West, 883 Mission St., San Francisco

DEMONSTRATION

MIXERS

January 1937

makes more sales per prospect

MATERIALS: a mixture that will hold up between occasional demonstrations, can be used over and over again; a vegetable that will not muss, that will keep for some time.

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SOAP POWDER, a small box, mixed with hot water, not too much, works up to a creamy lather. A drop of food coloring is effective in contrast to colored mixing bowls. Will last throughout the day.

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POUND OR TWO of Crisco or other shortening with a touch of food coloring. Will last several days. Use a cellophane mixer cover between demonstrations to keep dust and dirt out and it will last for a week or more.

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ICING—made of 4 egg whites, (unbeaten) and a cup and a half of red current jelly, makes a mixture that can be eaten or tasted by the prospect.

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DEMONSTRATE JUICER without any fruit, as it makes a mess which cannot be left from demonstration to demonstration. Simply illustrate by cupping the hand over juice reamer, operating at low speed.

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MAYONNAISE MAKING can be illustrated by allowing a little water to drip from juicer into some of the soap lather in the small bowl while the mixer works.

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ATTACHMENTS need not all be demonstrated. Select one, such as pea sheller or vegetable slicer or shredder, and have materials ready for quick demonstration of it in action. Explain action of other attachments only. Pea sheller is excellent because peas keep in the pod for several days. A pound or two will make many demonstrations. Use just a few at a time. Keep a cloth handy to wipe up juice. Carrots in a slicer are also quick and easy.

—Sales Points

Use These in Your Presentation

Saves her hands
Keeps her hands free from fruit stains, cuts, scraping; saves her "elbow grease" in beating, stirring, etc.

Saves her time
No trick at all to mix a cake or biscuits quickly, prepare vegetables, get a meal ready.

Assures repeated success
Every cake can be a success with the same measured quantities, thoroughly mixed. Texture of the cake is smoother, tastier.

Saves money on prepared foods
Home made mayonnaise, spiced to suit your own taste; other delicacies, cookies, cakes, soup stocks from meat and vegetable trimmings, can save the housekeeper money.

Improves the food and serving
Vegetables, precisely sliced or shredded, look better when served, cook better than whole, taste better too.

Makes servant unnecessary
Right at hand to perform its kitchen tasks efficiently, the mixer doesn't talk back, ask for days off, require a room and board, quit in a huff. It is reliable.

Is more sanitary
Like modern food factories, food is not touched by hand nearly so much.

Makes the kitchen modern
Attractive modern appearance makes it a thing of pride to own and show friends.

Easy to keep clean
Less trouble to keep clean or clean after use than the old hand tools they replace.

(See Appliance Sales Guide for November, 1936, for complete summary of sales points told in customer language; also for hints as to selling, advertising, display, sales talk.)

No. 1A

SHORT SALES TALKS That hurdle Sales Resistances

MIXERS

EVERY salesman, while presenting the good features and the services which may be expected from an appliance, is faced with difficult sales resistances, obstacles which the prospect throws in his path to delay buying or permit more shopping around. The good salesman is quick to recognize the true motive behind these objections and to meet them with positive sales suggestions that help the prospect to decide to buy. In this and the following Sales Guides salesman Bill Smith, will show how to overcome the most common obstacles. Naturally he will illustrate only such sales resistances as do not involve specific product detail, but which will help any salesman out of a tough spot. Notice how Bill Smith, the successful salesman, meets the following obstacles. Then use these ideas if similar objections are thrown across your own path.

When the prospect says—

***Prospect:* "I'm afraid we wouldn't have much use for a mixer except for making orange juice occasionally. They are nice to have but I really would not get my money's worth out of it."**

HOWEVER she words it, this type of obstacle springs from resistance to change. She has her housekeeping habits fixed and does not want to go through the struggle necessary to learn a new way of doing things. This is the salesman's most stubborn sales resistance. See how Bill attacks it with advantages which would come from a change of habits.

BILL: "You would not find much use for it? Yes, I can appreciate that you might not at first, until you got into the habit of using this mixer in preference to some of the older tools and implements you are now familiar with. But you have to put so much of your own strength into hand tools, wearing out your arms with beating and stirring, tediously grinding away at oranges to extract only a part of their juice. Now with this electric mixer electricity does all the tiring work. You save your hands and fingers from fruit and vegetable stains, from cuts and soreness, save your arms the ache of prolonged stirring. I know you will find that the texture of your cakes will be smoother, and with better mixing, tastier too. You'll feel more like eating your own cooking because you are not tired by the very preparation of the food. The secret of satisfaction with a mixer, my customers have told me, is to set it up in the kitchen and leave it set up—never put it away. Then it soon becomes second nature to turn to it for all the stirring and beating that require muscle and time. You will find it is no trick at all to stir up a cake, and instead of dreading to make one, will take pride in making them oftener. You will be happy too to see how smooth the grain is. As for orange juice, you'll find it easy to have it every day instead of only occasionally, and also that the oranges yield more juice than they did by hand squeezing. Why not get this kitchen helper to stand at your elbow and start making life easier for you—beginning tonight? What do you say?"

When the prospect says—

***Prospect:* "I've heard they are not strong enough. A friend of mine has one and it either hasn't enough strength when it goes slow, or it throws flour and batter all around when it goes fast. I'd rather not bother with it."**

HERE Bill or any salesman faces resistance caused by previous performances that have proved unsatisfactory, either because the device used was inadequate or poorly designed. See how he shows that new developments have eliminated the problem, and how he turns the objection toward a sale.

BILL: "Hm, not strong enough? Yes, that was true of some of the earlier models, particularly the very early ones. But the manufacturers of mixers, like those of motor cars, have been constantly improving their design. I am glad you mentioned this because it gives me an opportunity to demonstrate to you how sturdy and powerful these modern mixers now are. *(Demonstrates as he talks)* This mixer now has the same rugged power on the slowest speed as it has on the very highest speed. In fact it is built now to do the heavy beating and mixing and kneading that has always made you dread making heavy batters, like fruit puddings and cakes, and candies such as taffy or divinity, or even the home made bread* that is always such a rare treat nowadays. Women have just given up making candy and bread too because the mixing was so strenuous. But what a fine reputation you can gain by making them with this mixer. You can surprise your friends and family, while the mixer does all the hard labor for you. Why not have me send this mixer out to your home this afternoon so that you can

* See Electrical Merchandising, Nov., 1936.

enjoy the relief from kitchen mixing that it will bring you? It will make you the finest cook in the neighborhood."

When the prospect says—

Prospect: **"Maybe I am old fashioned, but I would rather do it by hand than bother with all these attachments. My goodness, I wouldn't use half of them. There are so many for a small family like ours."**

HERE, too, is the fear that the machine is complicated, one of the most common fears that women entertain. It makes them resist improvement and go on with out-of-date methods. But be careful not to tell her or even infer that she is old fashioned, even if she gives the lead. It will only make her retreat to protect her position, and then the sale is sunk. Notice how Bill deftly converts this objection into a sale.

BILL: "I can't say I blame you for feeling that there are too many attachments when you see them all spread out here as we must do to display them. But do not let this first impression deprive you of the pleasure and the help that the mixer itself will bring you from the very moment you connect it in your kitchen. We usually advise anyone buying a mixer just to take the mixer itself first, with the bowls and beater, and the fruit juice extractor. And it is a mighty good idea when you bring it home, to give away your old egg beater and hand fruit extractor, so that you will learn to depend on it entirely from the first for all your mixing and beating. Then as its use becomes second nature, you will want to enlarge its helpfulness, for it will do all you ask it so well, you will want it to serve you in other ways. Then as you buy an attachment, do the same with it as with the egg beater; give the old hand affair away. The new attachment will take no more room in your cupboard than the implement it replaces, and keeping it clean will be even less effort than with the old one. Some attachments you may never want, others will prove so handy and helpful that you will wonder how you did without them. So let's start you with the everyday kitchen help of the mixer right away. I will have it delivered this afternoon if you like, and you can find out even tonight how it saves your wrists in making the smoothest, creamiest mashed potatoes you ever tasted."

When the prospect says—

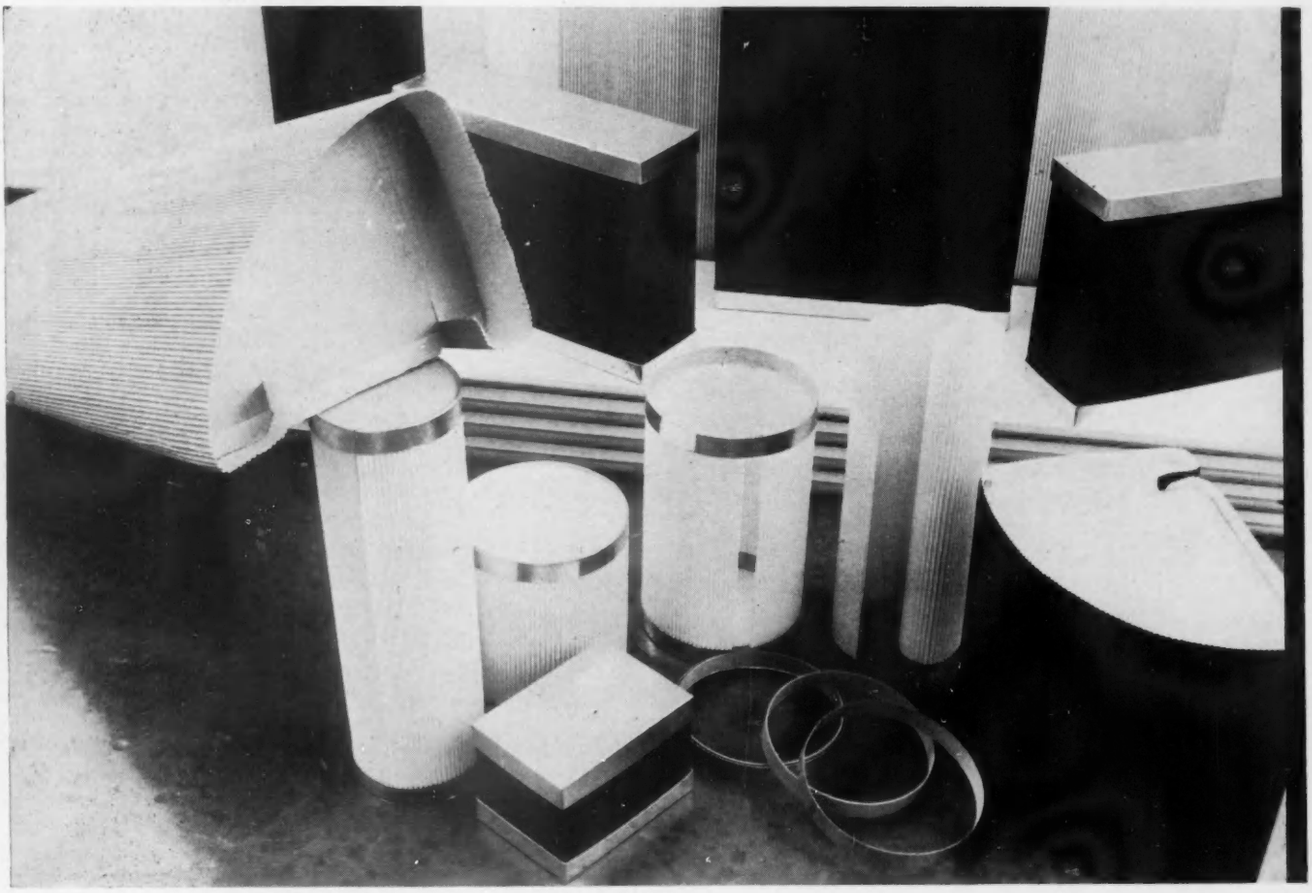
Prospect: **"It seems a lot to pay for a mixer. Haven't you one that is less expensive?", or, "How much does it cost to operate?"**

BOTH of these are price resistances; one of the mixer, the other on operating cost. Both require overbalancing the impression of cost with so many advantages that the cost seems exceedingly reasonable. It is a mistake in either case to agree with any impression that the mixer or its operation is expensive. To agree that operation is costly is to build up a resistance to all future appliance sales to that customer. See how Bill handles these price obstacles.

BILL: "One that is less expensive? I appreciate how important it is to save money these days; there are so many places it has to go. That's why, after investigating several makes and kinds I decided on this particular brand; it really is the most economical in the long run. When you begin to use this mixer and it saves your fingers and hands from fruit and vegetable stains, and your arms from weary, fatiguing chores, when it mixes so thoroughly and evenly, when it saves you so much of the juice from oranges and really pays for itself in savings when you make your own mayonnaise to suit your own taste, I really feel that it is a wonderful bargain, and it would be at twice its present price. There is no appliance you use which gives you so much in service, such excellent results on so little current. Why not give it a chance to earn its own cost and keep in your own kitchen by beginning to use it right away? If you like, I shall be glad to arrange easy terms so that your monthly savings from it will more than pay you back."

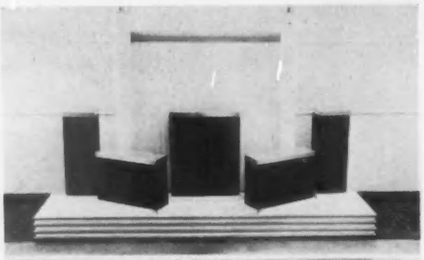
IN each case, you will notice Bill has put all the heavy emphasis on the SERVICE and the SAVINGS, the CONVENIENCE and the PRIDE OF OWNERSHIP that his prospect will derive from the mixer. Such sales points are the ones that surmount the obstacles, no matter how difficult. Notice, too, how he gracefully asks for the order at the end of each answer. Use these ideas and you will close more sales per prospect.

CALIFORNIA OREGON POWER CO. · PORTLAND GENERAL ELECTRIC CO.
MOUNTAIN STATES POWER CO. · PUGET SOUND POWER & LIGHT CO.
PACIFIC POWER & LIGHT CO. · IDAHO POWER CO.
NORTHWESTERN ELECTRIC CO. · WASHINGTON WATER POWER CO.
UTAH POWER & LIGHT CO.



DISPLAY

Every dealer can use these inexpensive materials to set up attractive appliance store or window displays easily and quickly



BIG stores, of course, have the services of expert window display men or departments. Smaller stores may not be able to afford such luxuries. Rather than feel badly about it, however, there is much they can do with little effort to build up effective yet simple windows. After all, what the display-man does is to make use of certain stock window display materials. The dealer too can use these. The question with him is what materials will provide the most versatility at the least cost.

Crepe paper has long been the standby of dealers. It is still effective, but is somewhat out of fashion in modern displays. A new material that is proving exceedingly versatile is colored corrugated cardboard. It comes in rolls of various widths, and in a large choice of colors. The picture at the top of this page illustrates how it can be quickly fashioned into a variety of forms.

For odd shaped forms a piece of paper carton is cut with a razor blade to the required shape, slit at the back in one or two places as shown at the extreme left, and the corrugated paper wrapped around it as a form and tucked into the slits to hold it together.

For tubes, boxes, cylinders, etc., that may be used to support small appliances in a display as shown in the photos in the center of the page, round, square, and oblong ends of stock sizes and shapes and covered with silver or gold paper, can be obtained from display materials jobbers. They come with hoops and drumheads for cylindrical forms, or boxes for cubes or similar shapes. These may be seen in the photo above.

Such shapes can be assembled in any symmetrical arrangement in a window, with a background made of another piece of the same corrugated board, (as shown at the left) and used to set off the appliances. Platforms of wood may be covered or faced with similar material, or of metallic surfaced corrugated paper. Quarter round moulding, finished in metallic paint or material makes a modern trim easily.

For specific appliances, manufacturers usually have both small and large window display material that can be used either with such display forms of your own, or alone. An attractive mixer display, using the mixer itself to provide motive power for an action display, is shown at the bottom of the page.

Save these Appliance Sales Guides. Another display idea will be illustrated on this page each month.

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Rankin Made I.E.S. Chairman Second Time

George M. Rankin, director of lighting sales, Southern California Edison Co. Ltd., was returned to the chairmanship of the Illuminating Engineering Society, Southern California Section, at the annual meeting held in Los Angeles recently. He succeeds R. A. Crosby, Los Angeles Gas & Electric Co., who has been president during the past year.

The new board of managers contains Mr. Crosby, F. A. Hanson, E. G. Neale, A. W. Nye and W. H. Robinson, Jr., with B. R. Deleray, of Westinghouse Lamp Co., as secretary. At the annual meeting Alston Rodgers, who had just joined the South Pacific District of G. E. Incandescent Lamp Division from the Nela Park laboratories at Cleveland, gave a resume of the I.E.S. convention recently held in Baltimore.

Frank VanGilluwe presented to George Rankin the I.E.S. historical gavel which is awarded to chapters of the I.E.S. on the basis of percentage of members attending the I.E.S. convention, multiplied by the official railway miles. The two members of the Southern California Section had traveled a long way to attend the convention. Thus the gavel was brought to southern California this year.

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Plan Next San Jose Electrical Show

San Jose unit of the Electric Appliance Society of Northern California has leased the entire civic auditorium in San Jose, from April 5 to 10, for another of its annual expositions of electrical appliances.

The main auditorium is to be used for domestic appliance exhibits exclusively, affording more space for exhibitors than last year. The cooking schools instead of being conducted in the main auditorium, will be held in the small Montgomery Theater at one end of the main hallway. Dunne Hall, another large room off the main auditorium, will house the commercial exhibit. This will be a novel feature and is expected to be exceptionally complete.

Details are being worked out by an experienced and enthusiastic committee, determined to make the exposition more outstanding than ever before.

• WHAT DO ARCHITECTS AND BUILDERS THINK of electrification of homes these days? To find the answer the San Jose division of Pacific Gas & Electric Co. contacted with 66 architects and builders, tabulating their attitudes toward gas heating, Red Seal wiring, electric ranges, and good lighting for residences. Of the 66, 7 were enthusiastic for Red Seal, 32 favorable, 26 indifferent, and only 1 unfavorable. For electric ranges 2 were enthusiastic, 19 favorable, 36 indifferent and 9 unfavorable. For good lighting, 11 were enthusiastic, 50 favorable, 5 indifferent and none unfavorable.

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• "PHOENIX BY NIGHT" was the front page title given to a special edition of the *Arizona Republic* when the entire electrical industry of the region began its lighting program. The center spread was a cooperative advertisement by electrical dealers and the Central Arizona Light & Power Co. featuring I.E.S. improved lamps. A cooperative selling program was conducted at the same time.

DEALER SALES REPORT—NOVEMBER 1936

A Summary of Dealer Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Department of Utilities

APPLIANCE	P. G. & E. Co.[1]		San Diego Cons. G. & E. Co.[2]		San Joaquin Lt. & P. Corp.[3]		So. Calif. Edison Co., Ltd.[4]		Utah Power & Lt. Co.[5]		Wash. Water Power Co.[6]		Idaho Power Co.[7]	
	*Nov. 1936	Year to date	Nov. 1936	Year to date	Nov. 1936	Year to date	Nov. 1936	Year to date	Nov. 1936	Year to date	Nov. 1936	Year to date	‡	‡
Ranges	336	3,795	95	595	149	1,611	537	5,978	220	3,262	70	2,122	.....	.....
Water Heaters	172	2,334	90	589	81	850	235	2,732	47	908	74	1,410	.....	.....
Air Heaters—aux.	929	5,995	350	1,300	137	691	408	1,647	493	1,727	589	1,631	.....	.....
Air Heaters, 220	116	843	.....	.....	105	326	.....	.....	.....	.....	.....	.....	.....	.....
Refrigerators	2,856	44,946	500	8,235	143	8,006	2,153	49,456	283	10,720	192	7,258	.....	.....
Dishwashers	11	230	.....	.....	7	25	.....	.....	.....	49	1	8	.....	.....
Washers	3,167	34,008	375	4,265	365	4,831	2,460	32,228	994	11,523	532	6,019	.....	.....
Ironers	797	9,655	90	925	63	910	432	6,233	42	566	44	630	.....	.....
Vac. Cleaners	2,709	25,389	200	2,065	91	1,123	964	11,030	750	7,055	240	2,339	.....	.....
Radios	11,797	91,532	1,125	10,550	803	6,803	5,418	53,748	2,416	15,806	2,437	14,875	.....	.....
Mixers	587	9,268	105	1,460	92	775	456	4,404	439	4,138	260	2,006	.....	.....
Cookers, Casseroles	.....	.....	75	665	55	591	113	879	50	241	283	3,814	.....	.....
Irons	.....	.....	375	4,080	361	4,294	1,557	16,229	1,434	14,940	936	8,202	.....	.....
Waffle Irons	.....	.....	200	1,915	161	1,253	650	5,176	757	5,543	431	2,382	.....	.....
Toasters	.....	.....	250	2,260	183	1,546	744	6,685	1,035	7,744	638	5,445	.....	.....
Table Stoves, etc	.....	.....	75	560	120	1,214	319	3,123	1,287	15,281	95	1,653	.....	.....
Heating Pads	.....	.....	100	1,050	121	406	401	2,085	670	3,077	276	1,533	.....	.....
Curling Irons	.....	.....	.....	.....	.....	.....	59	558	382	3,811	.....	.....	.....	.....
Coffee Makers	.....	.....	150	2,155	184	1,223	349	3,841	731	5,757	916	5,123	.....	.....
Sewing Machines	1,157	13,161	45	505	.....	.....	.....	.....	149	1,696	44	697	.....	.....
Clocks	.....	.....	325	3,050	141	1,269	896	5,419	637	5,560	450	2,794	.....	.....
Fans	.....	.....	.....	.....	7	2,412	33	4,540	18	4,804	25	2,588	.....	.....
Floor Polishers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sun Lamps	.....	.....	.....	.....	.....	.....	30	462	13	108	43	78	.....	.....
Reflector Lamps	.....	.....	.....	.....	249	1,218	.....	.....	.....	.....	1,691	8,310	.....	.....
Misc. Lamps	.....	.....	.....	.....	195	496	758	8,501	.....	.....	1,072	11,497	.....	.....
Yard Lights	.....	.....	.....	.....	26	489	.....	.....	.....	.....	.....	.....	.....	.....
Misc. Small Appl	.....	.....	.....	.....	97	2,267	.....	.....	1,473	10,744	.....	.....	.....	.....
Total Dealers	1,400	.....	.....	.....	.....	.....	.....	.....	1,636	15,657	.....	.....	.....	.....
No. Reporting	.....	.....	.....	.....	107	113†	479	487†	.....	.....	.....	.....	.....	.....

[1] P. G. and E. reports obtained only on major appliances upon which accurate reports are available from dealers' accounts. Ranges, water heaters, and air heaters include company and dealer sales. Total dealers include gas as well as electric dealers. * Previous month's figures shown under current month's heading.
[2] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table. Clocks, fans included under miscellaneous.
[3] Includes dealer reports from Midland Counties Public Service Corp. territory also. Compiled by Valley Electrical Supply Co.
[4] Includes reports from dealers on San Joaquin Valley system of the company as well as Southern California areas served.
[5] Includes Utah Power & Light Co. territory in Utah, Idaho and Wyoming. Also Western Colorado Power Co. territory.
[6] Dealer sales only for Spokane and company's territory. Company sales not included. Table stoves, grills included with cookers.
[7] Figures compiled by Electrical Equipment Sales Association. Include power company sales and sales of all reporting dealers—about 60% report.
† Arithmetical average of number of dealers reporting. ‡ November report not available at time of going to press.

Engineering Symposium + + +

[A monthly forum in which engineers will present and discuss their problems, this department is dedicated to advancing the art of power generation, transmission, distribution and utilization]

Increasing The Capacity of The Northwest's Largest Boiler*

By RUSSELL F. MILLER
Portland General Electric Company

THIS unit, a 2,650 hp., 450-lb. pressure Babcock and Wilcox Sterling type boiler, equipped with forced and induced draft, tubular air pre-heaters and partial water walls in the combustion chamber, was installed at the main steam stand-by station of the Portland General Electric Company in 1930. It was designed for burning either oil or wood refuse, but it has been found that during the yearly period of heaviest demand on steam it has been necessary to burn oil exclusively, due to the coincident scarcity of wood refuse.

In 1935 there occurred a considerable increase in system load which made it desirable to enlarge the capacity of this unit, especially under oil firing conditions. A further consideration was to better its continuity of service, as the outage of a unit of this size during heavy steam operation would be serious.

Wood refuse is fired in eight extended Dutch oven type furnaces, four on each side of the boiler, a total of 512 sq. ft. of grate surface. When burning wood refuse alone, ratings as high as 370 per cent could be carried with good results.

Under oil firing conditions, however, 295 per cent of rating was the maximum safe load without causing damage to the refractory, and resultant boiler outage. The oil burning equipment as first installed consisted of 21 San Diego type mechanical atomizing burners, placed in two rows just below the lower boiler drum, firing directly into the combustion chamber. Each year extensive refractory repairs were necessary in that part of the combustion chamber not protected by water walls; that is, the burner wall below the lower drum and the front curtain wall directly across from the oil burners. (See plate 1). In all, there were over 920 sq. ft. of unprotected refractory surface in the combustion chamber.

In considering the advisability of more water walls in the combustion chamber, some concern was felt as to what effect the lowered combustion chamber temperature would have on a fuel with as high a moisture content as wood refuse, running in some cases to 54 per cent. However, in this case, with a very large combustion chamber —about 8.5 cu. ft. per boiler hp.—it was thought that this could be safely tried, provided bare tubes were not used. It was therefore decided to use Bailey part studded tube construction. In this design only part of the tube is exposed. The space between the tubes is filled with a special plastic refractory, held firmly in place by studs welded to the tubes.

The unit was originally designed for 725 deg. total steam temperature burning wood refuse, but this result had never been obtained. It was decided also to remedy this condition so far as possible without the addition of more superheater surface, which, in an installation of this kind, would be quite difficult and costly.

It was desired to bring the maximum boiler rating burning oil to 450 per cent, which required a considerable increase in forced draft, both in quantity and pressure. The two original fans operated at 900 r.p.m. and delivered 35,000 cu. ft. per min. against a water pressure head of 4½-in. The new wheels were designed for 50,000 cu. ft. per min. at 1,250 r.p.m. against 7½-in. of water. An interesting feature of this change was that the same fan shafts, bearings and scroll cases were used for the new wheels, which made a considerable saving over the cost of a complete new fan.

Boiler Construction Details (Plate 2):

The first row of boiler tubes was removed and the tube holes left open in the lower drum for the admission of the downcomer tubes protecting the burner wall. Another consideration in the removal of this heating surface from the first pass was to increase the gas

Engineering Reports

In this issue engineering reports of the Rocky Mountain Electrical Association are concluded on pages 45 to 53. Beginning with this article, Electrical West will publish serially reports of the Engineering and Operation Section of the Northwest Electric Light and Power Association and the Pacific Coast Electrical Association.

Operating data on 2,650 Hp. Boiler at Station L. Before and After Complete Water Wall Installation

MAXIMUM CAPACITY TESTS

	Before	After	Before	After
Date of Test	7-11-34	10-6-36	1-22-36	8-18-36
Kind of Fuel Fired	Oil	Oil	Wood Refuse	Wood Refuse
Steam Pressure Drum, lbs./sq. in.	417	424	407	422
Steam Pressure Super Heater Outlet, lbs./sq. in.	389	360	369	371
Steam Temperature °F	620	645	677	702
Feed Water Temperature °F	349	359	348	358
Evaporation, lbs. per hr	272,000	405,000	325,000	365,000
Boiler Rating %	294	452	370	422
Fuel Oil Temperature °F	180	172	...	...
Fuel Oil Pressure, lbs./sq. in.	244	306	...	...
Fuel Oil Consumed, bbls./hr.	58.3	87.8	*	*
Evaporation, lbs./bbl.	4,664	4,610	...	...
Temperature Gas Leaving Boiler °F	729	834	763	811
Temperature Gas Leaving Preheater °F	474	460	542	488
Temperature Air to Preheater	80	80	80	80
Temperature Air from Preheater	389	420	417	467
Air Pressure to Preheater, in. H_2O+	4.1	7.3	3.0	2.1
Air Pressure from Preheater, in. H_2O+	3.5	6.0	1.8	1.7
Blast Box Pressure, in. H_2O+	1.5	4.8	...	...
Air Pressure Under Grates in. H_2O+	...	...	.47	.09
Draft Over Grates in. H_2O—	...	...	.32	.58
Draft Combustion Chamber in. H_2O—	.39	.23	.47	.66
Draft Boiler Outlet in. H_2O—	.7	1.2	3.6	3.10
CO^2 %	14.8	14.8	16.2	17.6
O%	0.6	1.1	3.7	2.0
CO^2%	0.9	0.0	0.1	0.1
Overall Boiler Efficiency %	74.2	73.4	...	...

*Measurements of Wood Refuse to Individual Boilers could not be obtained.

* A report prepared for the Production Committee, Engineering and Operation Section, Northwest Electric Light & Power Association for presentation at 1937 Annual Section Meeting.

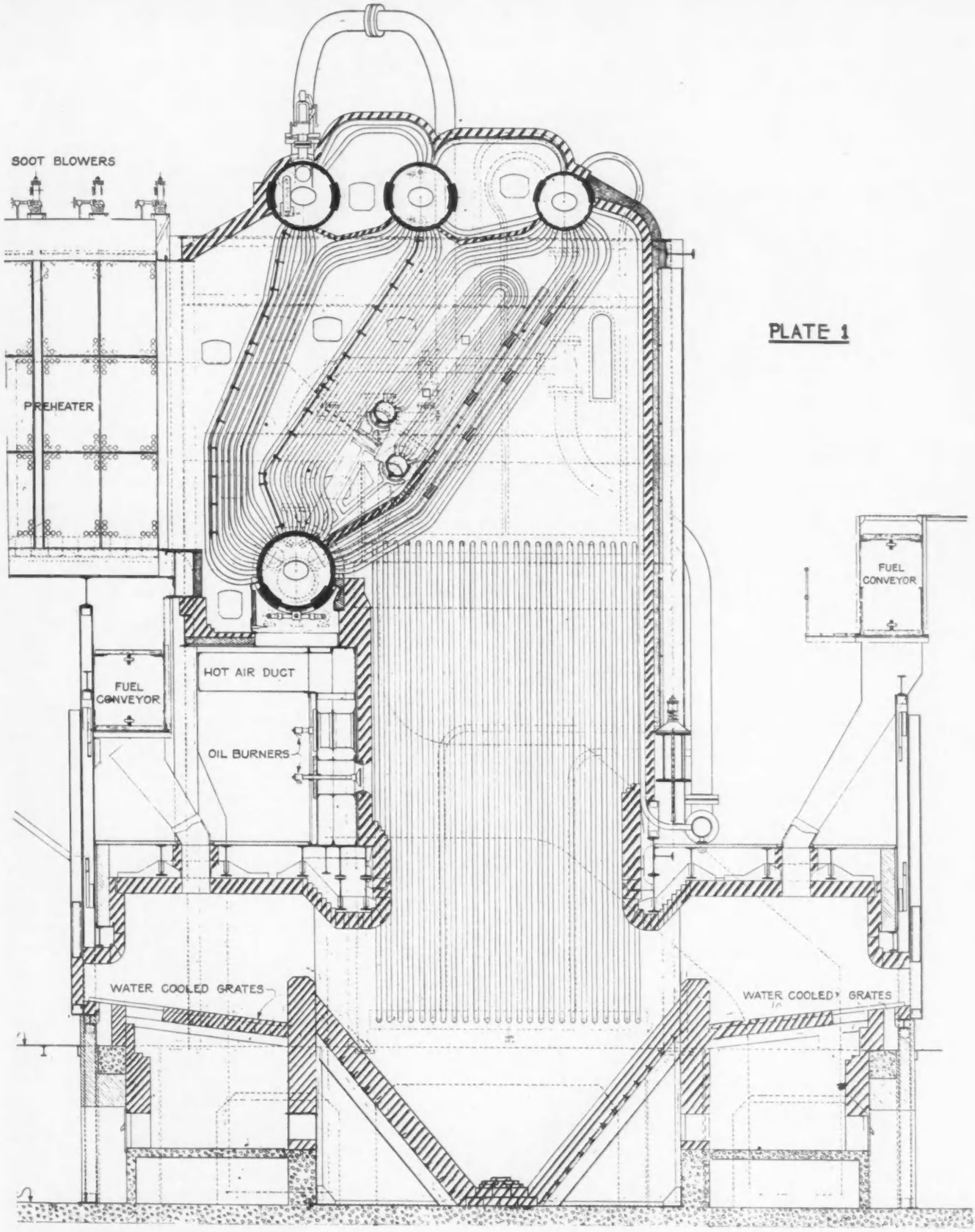


PLATE 1

temperature in the superheater zone. In the original set-up, there were 21 burners in two rows, these being staggered. In the new arrangement, twenty burners were used in two rows, with burners in line, so that the new wall tubes could be bent around the burner openings. Where the wall tubes cross

Plate No. 1—Cross-section of the boiler before changes described in the article were made, which changes resulted in a net gain of 11,400 kw. of station capacity

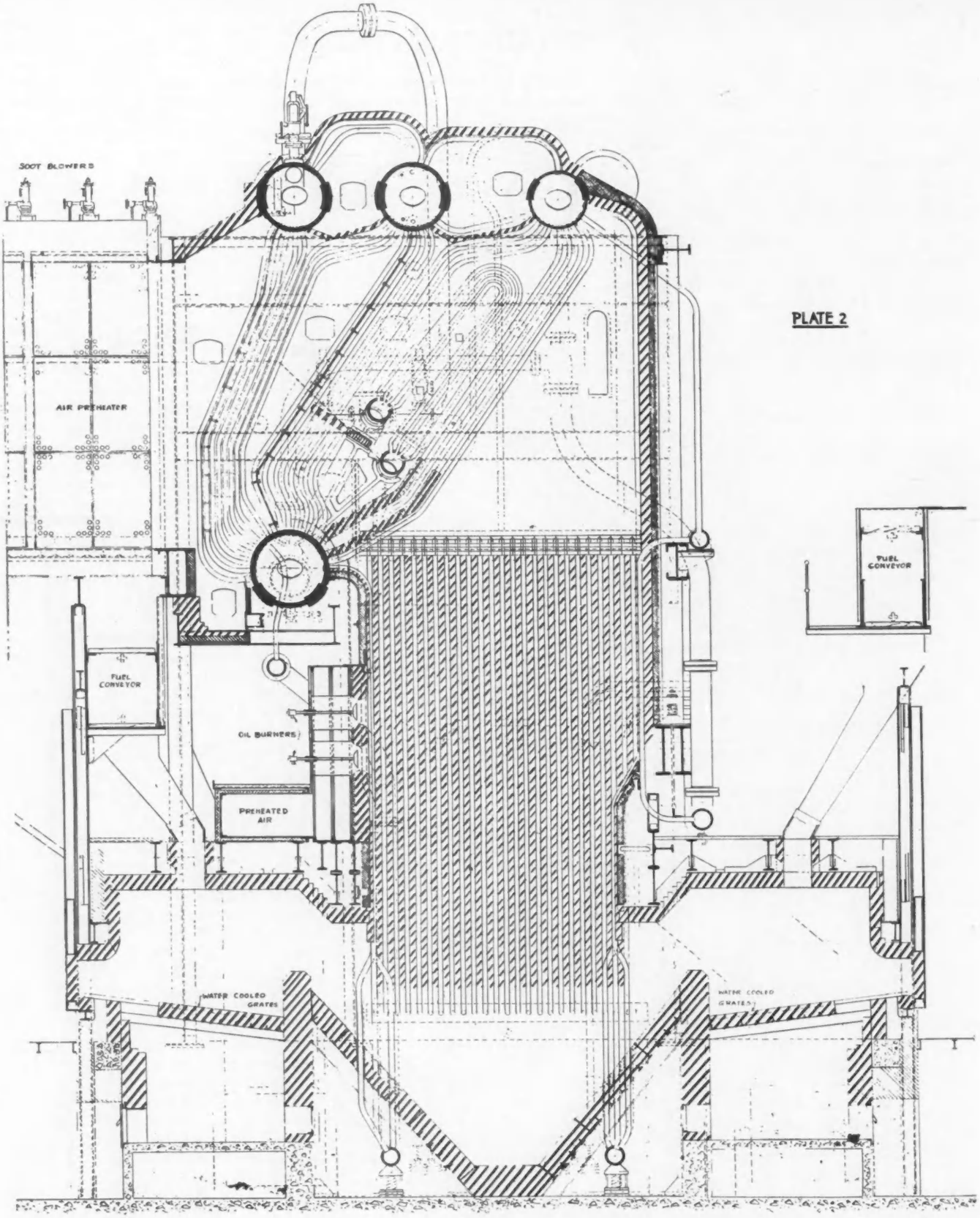


Plate No. 2—Comparison with plate No. 1 will indicate the changes in water wall construction and tubing to provide increased capacity

the throat of the Dutch ovens they are bent and staggered so that there are 14 in. of clearance between rows of tubes. The tubes are then carried through the hopper bottom to a header in the space below. To take care of water supply, a 10-in header is placed below the lower drum with thirty 3¼-

in. tubes connected through the lower drum to 30 No. 8 boiler tubes. All water supply for the downcomer water wall therefore comes from the upper middle drum. The 10-in main supply line is connected to the lower header on each end.

The original sidewall bare tubes were removed and replaced with studded tubes. Additional structural steel was installed to take care of the added weight of the special refractory between the tubes.

The new front wall upper header was placed 15 ft. above the original lower header with the new wall tubes coming out between the original wall tubes, thus giving a solid bank of 3¼-in. tubes about 11 ft. in height. The studding on the new tubes in this section commences where tubes leave the original wall header and extends down to one foot below the refractory flat arch. Other details of this wall are substantially the same as the downcomer wall, except that the water supply is taken from the existing supply pipe for the old header. The riser or steamer tubes were rolled in the tube holes left vacant in the upper front drum by the removal of the first row of boiler tubes.

The refractory trickle baffling in the first pass tubes was removed down to the superheater headers to increase the gas temperatures around the superheater.

Results

The work was completed August 1, 1936, and has resulted in a net gain of 11,400 kw. in station capacity under oil firing conditions. Judging from our previous experience, an extended run on oil such as we are having at present would have undoubtedly caused a boiler outage for refractory repair. The unit has been on the line continuously since August 1, and to December 1 has generated over 780,000,000 lb. of steam, the maximum day's run being 8,830,000 lb. The accompanying tabulation of operating data shows maximum capacity tests taken before and after the water wall installation, with both oil and wood refuse.

The operating characteristics of the unit have been considerably improved, and control under varying loads made much easier. Formerly, it was necessary to have two firemen when wood refuse was used at high rating, whereas the unit can now be handled easily by one man with either fuel.

So far, it is felt that the results have amply justified the changes.

Rocky Mountain Electrical Association Reports

Preliminary Cost Data on Small Steam Plants

By MR. A. A. WOODWARD
Chairman, Prime Movers Committee
Rocky Mountain Electrical Association

A PRELIMINARY report has been prepared by the Prime Movers Committee, presenting some information on the investment costs and fixed charges and operating expense on small steam engine plants. A final report will be submitted at a later date, together with curves of costs of investment and operating expense. A few figures may be included at this time to indicate the trend of the report and the information which has been collected to date.

Two types of engines were studied, they are the Corliss valve and Uniflow. The sizes included 100, 200 and 500 kw. Several operating conditions were considered and are as follows: (1) 150 lb., 0 deg. super heat, noncondensing. (2) 150 lb., 0 deg. super heat, 4 in. absolute pressure in the condenser. (3) 200 lb., 100 deg. super heat, 4 in. absolute pressure in condenser.

Investment costs did not include land, buildings or boiler room equipment. No credit is allowed for steam heat nor was any allowance made for standby. A minimum fixed charge on investment was taken at 12½ per cent, based on a twenty-one year life, altho if a five-year basis is to be considered the fixed charges must be increased to 27.65 per cent.

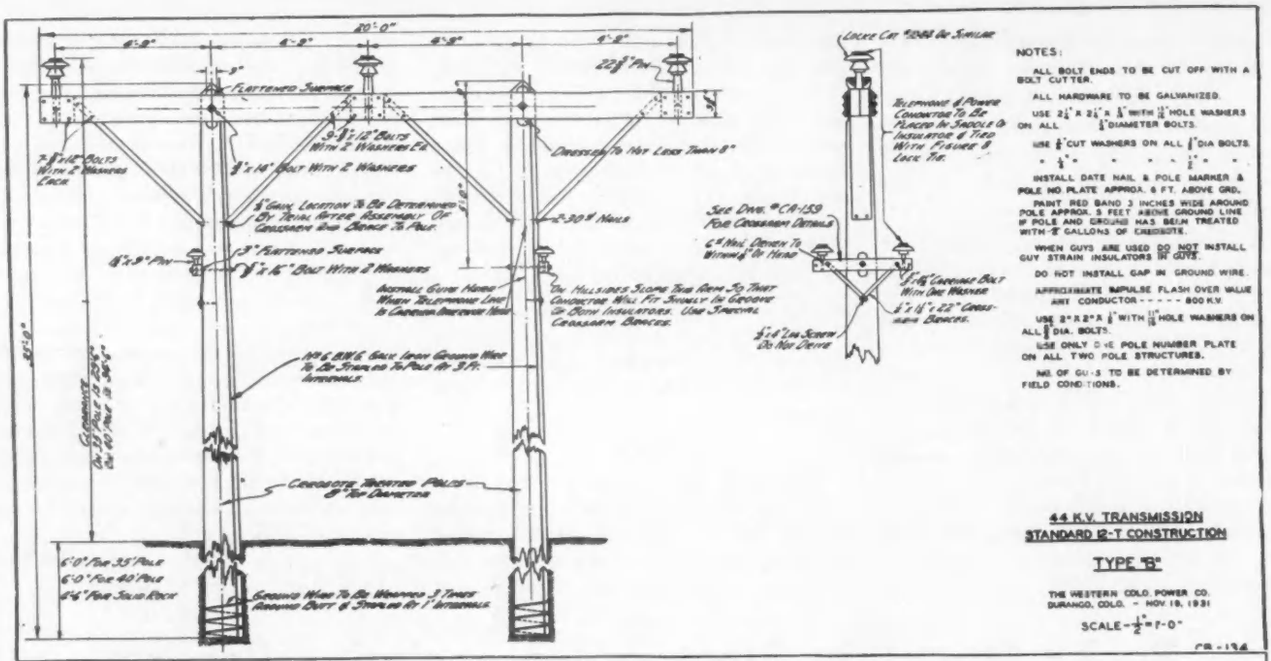
Fuel costs are calculated for all plants at 25 per cent and 100 per cent load factor and were based on coal at $2.00, $3.00 and $4.00 per ton, with a boiler efficiency of 68 per cent at the 25 per cent load factor and 70 per cent at the 100 per cent load factor.

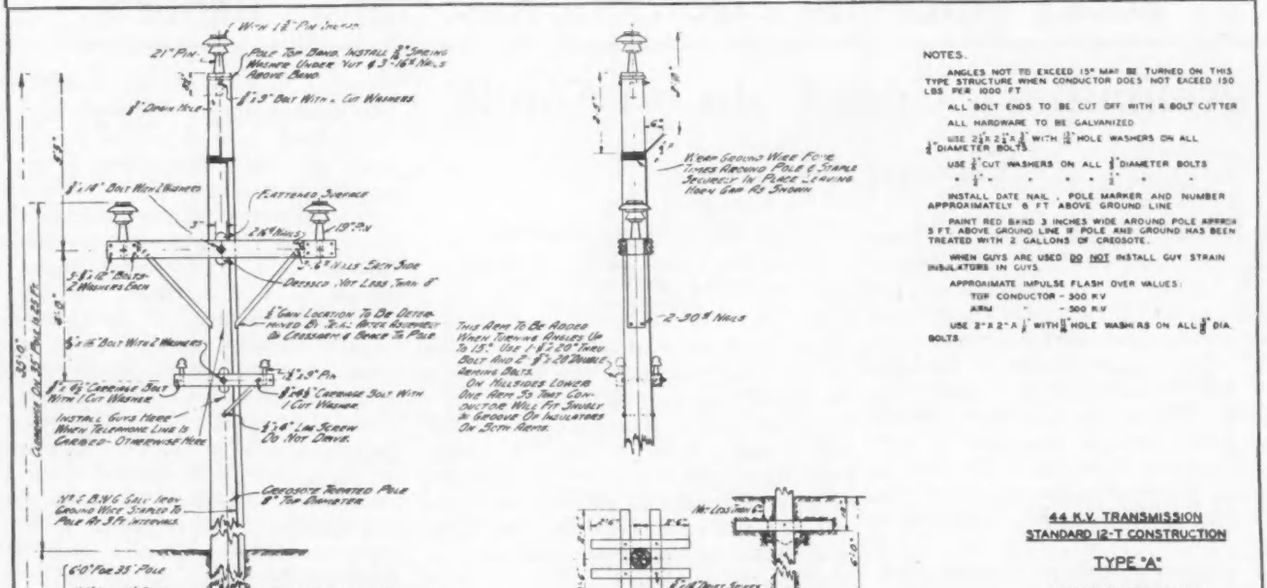
Labor costs were based on the use of one operator at 25 per cent load factor and three operators for the 100- and 200-kw. units at 100 per cent load factor. In the case of the 500-kw. unit, one part-time helper was included in the 25 per cent load factor and four operators at the 100 per cent load factor. Operation costs included operating supplies, operating labor and lubricating oil expense.

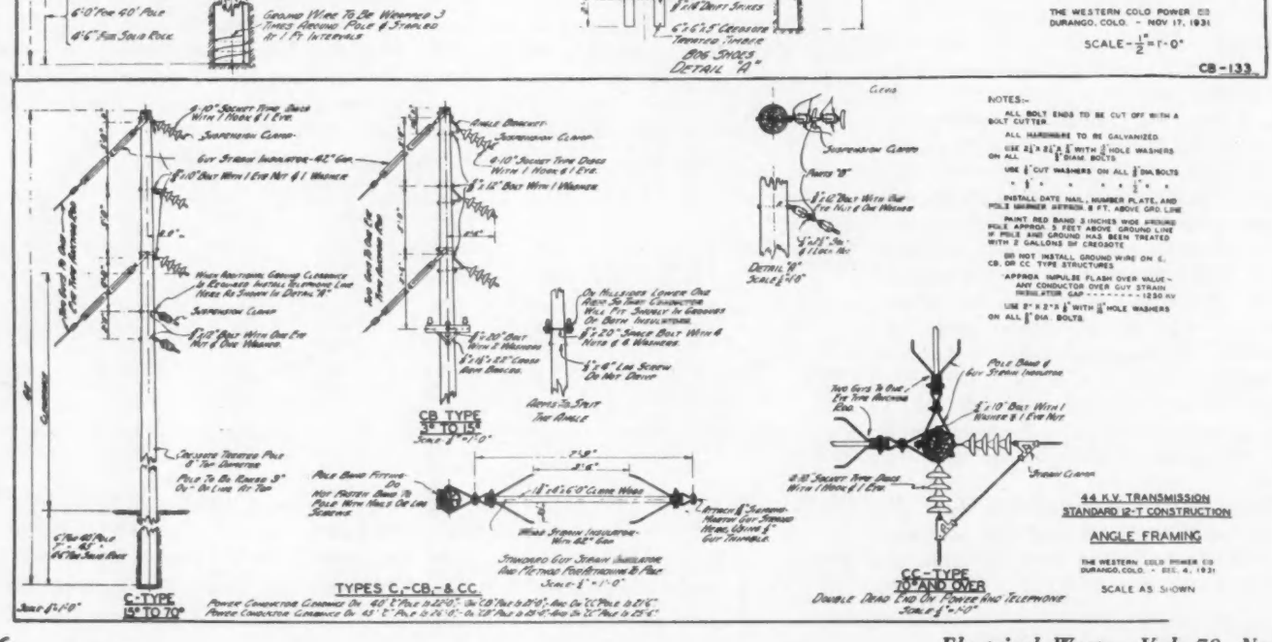
As a result of these studies a few interesting points can be brought out. The uniflow engine shows slightly better over-all costs than does the Corliss type, but the improvement is not so marked as is generally believed. While the improvement in water rate and fuel economy is very material, nevertheless this saving is partly offset by an increase in fixed charges, because of greater investment. If the investment charges incident to boiler room equipment were included, a further credit would accrue to the uniflow engine, because of its lower steam consumption—therefore, smaller boilers. Surprisingly little benefit is derived from the condensing operation of these small size engines. The inclusion of boiler costs would tend to increase the spread, however, since the cost of boilers for condensing operation could be lower than that for non-condensing operation. The addition of 100 deg. super heat improves the over-all costs materially in both types of engines.

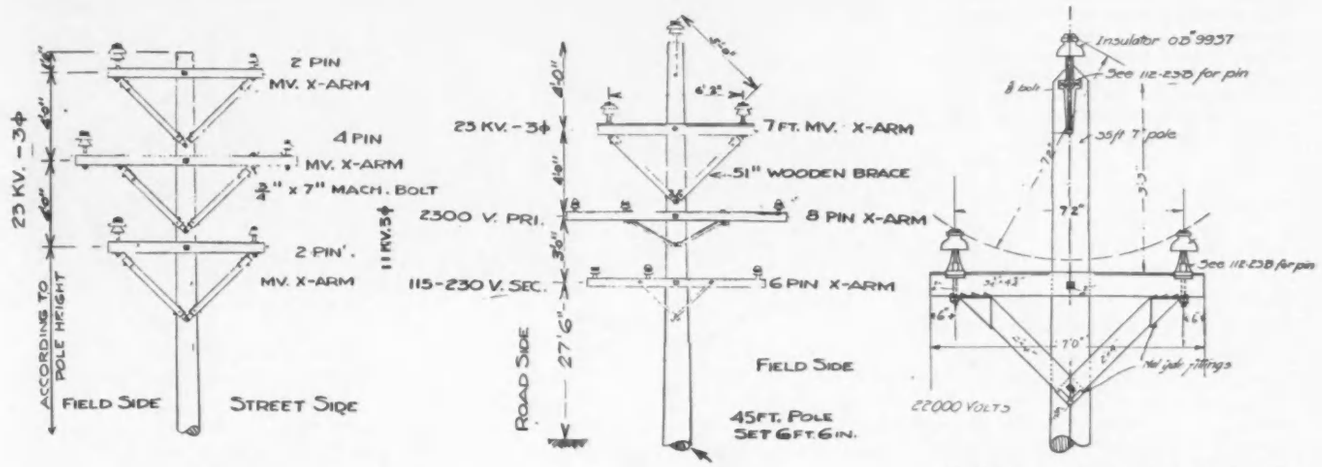
Summary of Total Production Costs in Dollars per Year on Small Steam Engines

Engine	Item	150 lb. 0 deg. NC	150 lb. 0 deg. 4 in.	200 lb. 100 deg. 4 in.	150 lb. 0 deg. NC	150 lb. 0 deg. 4 in.	200 lb. 100 deg. 4 in.
100 kw. Corliss	Coal @ $2.00/ton	$ 4,820	$ 5,475	$ 5,055	$11,980	$12,460	$11,645
	$3.00	5,695	6,235	5,685	14,320	14,610	13,465
	$4.00	6,560	7,000	6,315	16,660	16,760	15,285
100 kw. Uniflow	Coal @ $2.00/ton	4,870	5,220	5,030	11,780	11,770	11,500
	$3.00	5,620	5,755	5,510	13,880	13,470	13,110
	$4.00	6,370	6,285	5,990	15,780	15,170	14,720
200 kw. Corliss	Coal @ $2.00/ton	7,905	8,325	7,935	18,095	18,565	17,335
	$3.00	7,940	9,775	9,265	22,525	22,635	20,865
	$4.00	11,576	11,225	10,595	26,995	26,705	24,395
200 kw. Uniflow	Coal @ $2.00/ton	7,405	8,015	7,520	17,915	17,415	17,045
	$3.00	8,750	9,035	8,350	21,945	20,635	20,435
	$4.00	10,045	10,055	9,175	25,975	23,855	23,625
500 kw. Corliss	Coal @ $2.00/ton	14,151	15,715	14,635	38,415	39,295	35,835
	$3.00	17,785	18,995	17,515	48,995	49,185	44,135
	$4.00	21,415	22,275	20,396	59,575	59,075	52,435
500 kw. Uniflow	Coal @ $2.00/ton	14,125	15,245	14,695	38,165	36,305	35,735
	$3.00	17,315	17,575	16,825	48,195	43,985	43,205
	$4.00	20,505	19,905	18,955	58,225	52,665	50,675


NOTES:
ALL BOLT ENDS TO BE CUT OFF WITH A BOLT CUTTER.
ALL HARDWARE TO BE GALVANIZED.
USE 2½" X 2½" X ¼" WITH ¹³/₁₆" HOLE WASHERS ON ALL ⅝" DIAMETER BOLTS.
USE ⅝" CUT WASHERS ON ALL ⅝" DIA BOLTS.
" ½" " " " " ¾" " "
INSTALL DATE NAIL & POLE MARKER & POLE NO PLATE APPROX. 6 FT. ABOVE GRD.
PAINT RED BAND 3 INCHES WIDE AROUND POLE APPROX. 5 FEET ABOVE GROUND LINE IF POLE AND GROUND HAS BEEN TREATED WITH 2 GALLONS OF CREOSOTE.
WHEN GUYS ARE USED DO NOT INSTALL GUY STRAIN INSULATORS IN GUYS.
DO NOT INSTALL GAP IN GROUND WIRE.
APPROXIMATE IMPULSE FLASH OVER VALUE ANY CONDUCTOR - - - - - 800 K.V.
USE 3" X 2" X ¼" WITH ¹³/₁₆" HOLE WASHERS ON ALL ⅝" DIA. BOLTS.
USE ONLY ONE POLE NUMBER PLATE ON ALL TWO POLE STRUCTURES.
NO. OF GUYS TO BE DETERMINED BY FIELD CONDITIONS.
44 K.V. TRANSMISSION
STANDARD 12-T CONSTRUCTION
TYPE "B"
THE WESTERN COLO. POWER CO.
DURANGO, COLO. - NOV. 18, 1931
SCALE - ½" = 1'-0"
CB-134


NOTES.
ANGLES NOT TO EXCEED 15° MAY BE TURNED ON THIS TYPE STRUCTURE WHEN CONDUCTOR DOES NOT EXCEED 150 LBS PER 1000 FT.
ALL BOLT ENDS TO BE CUT OFF WITH A BOLT CUTTER
ALL HARDWARE TO BE GALVANIZED
USE 2½" X 2½" X ¼" WITH ¹³/₁₆" HOLE WASHERS ON ALL ⅝" DIAMETER BOLTS.
USE ⅝" CUT WASHERS ON ALL ⅝" DIAMETER BOLTS
" ½" " " " " ¾" " "
INSTALL DATE NAIL, POLE MARKER AND NUMBER APPROXIMATELY 6 FT ABOVE GROUND LINE
PAINT RED BAND 3 INCHES WIDE AROUND POLE APPROX 5 FT. ABOVE GROUND LINE IF POLE AND GROUND HAS BEEN TREATED WITH 2 GALLONS OF CREOSOTE.
WHEN GUYS ARE USED DO NOT INSTALL GUY STRAIN INSULATORS IN GUYS.
APPROXIMATE IMPULSE FLASH OVER VALUES:
TOP CONDUCTOR - 300 K.V
ARM " - 500 K.V
USE 2" X 2" X ¼" WITH ¹³/₁₆" HOLE WASHERS ON ALL ⅝" DIA. BOLTS.
44 K.V. TRANSMISSION
STANDARD 12-T CONSTRUCTION
TYPE "A"
THE WESTERN COLO POWER CO.
DURANGO, COLO. - NOV 17, 1931
SCALE - ½" = 1'-0"
CB-133


NOTES:-
ALL BOLT ENDS TO BE CUT OFF WITH A BOLT CUTTER
ALL HARDWARE TO BE GALVANIZED.
USE 2½" X 2½" X ¼" WITH ¹³/₁₆" HOLE WASHERS ON ALL ⅝" DIAM. BOLTS
USE ⅝" CUT WASHERS ON ALL ⅝" DIA. BOLTS
" ½" " " " " ¾" "
INSTALL DATE NAIL, NUMBER PLATE, AND POLE MARKER ABOUT 6 FT. ABOVE GRD LINE
PAINT RED BAND 3 INCHES WIDE AROUND POLE APPROX. 5 FEET ABOVE GROUND LINE IF POLE AND GROUND HAS BEEN TREATED WITH 2 GALLONS OF CREOSOTE
DO NOT INSTALL GROUND WIRE ON C, CB, OR CC TYPE STRUCTURES
APPROX IMPULSE FLASH OVER VALUE - ANY CONDUCTOR OVER GUY STRAIN INSULATOR GAP - - - - - - - 1250 KV
USE 2" X 2" X ¼" WITH ¹³/₁₆" HOLE WASHERS ON ALL ⅝" DIA. BOLTS.
44 K.V. TRANSMISSION
STANDARD 12-T CONSTRUCTION
ANGLE FRAMING
THE WESTERN COLO POWER CO
DURANGO, COLO. - DEC. 4, 1931
SCALE AS SHOWN
TYPES C, CB, & CC
C-TYPE 4° TO 70°
CB TYPE 3° TO 15°
CC-TYPE 70° AND OVER
DOUBLE DEAD END OR POWER AND TELEPHONE



(Left) and (center) typical pole framing with wood insulation used by Public Service Co. of Colorado. (Right) 22-kv. design used by Trinidad Electric Transmission, Railway and Gas Co.

All-Wood Construction of Sub-Transmission Lines

By MR. O. P. REED
Chairman, Overhead Systems Committee, Rocky Mountain Electrical Assn.

In connection with the operation of distribution and transmission systems, there has been considerable interest recently both nationally and locally in lines equipped completely with wood insulation. Data is available on the operating results of lines of higher voltage with complete wood insulation. Lines of this type in the sub transmission class are of particular interest in this locality. Two systems have had outstanding records with lines of this character. This is particularly true on the system of the Western Colorado Power Company, where a line sixty-two miles in length, seven years of age, operated at 44 kv. had no outages in 1934, due to lightning, with one in 1935 and two in 1936 to date.

From accompanying illustrations it will be noted that special cross arm construction has been used, the cross arms consisting of two members braced internally with a flat wood brace of approximately 2-in x 8-in. material. This is framed into the cross arm and into the pole as indicated. A ground wire extends up the pole to a point approximately midway between the three conductors, where it is wrapped four times around the pole and an arc horn is extended out from the pole approximately 6 in. The H-frame construction is similar in character to the construction of the line pole.

Typical wood insulation construction used by Western Colorado Power Co. (Top) 44-kv. structure for horizontal configuration of conductors. (Center) standard all-wood insulation pole framing for 44-kv. circuits. (Bottom) typical angle framing for 44-kv. construction

The Public Service Company of Colorado has a line in the Grand Junction territory fifteen miles in length, operated at 22 kv., between the Grand Valley Hydro plant and Grand Junction. This is one of the lines which was indicated on the drawing of this territory used in connection with the discussion of the step voltage regulator installation. (See ELECTRICAL WEST, December 1936.) This is a standard wood pole line utilizing standard hardware and steel pins with triangular configuration of conductors. Wood braces of the type now on the market have been utilized. Only two outages have occurred on this line since its installation in 1934, one of which was due to a tree short-circuiting the line conductors in a river crossing during a flood. The other was of unknown origin and may have been due to lightning. During 1934, 1935 and 1936 to date, lightning storms occurred on 82 days. One other interesting feature of this line is staggering of conductor positions where additional circuits are carried on the pole line, as indicated in drawing. This has been done to minimize the possibility of interference between conductors during periods of heavy sleet loading.

Auto Transformers Improve Service on Long Feeders

By C. H. KOCH
Manager Ft. Lupton District, Colorado Central Power Company

THE Colorado Central Power Company has made use of auto transformers in districts where the load density is light and where the load is some distance from the distribution transformers. The long secondary resulted in unsatisfactory voltage and lamp flicker until this remedy was adopted. This equipment has improved conditions and eliminated complaints from customers. A particular case has been given here to illustrate the improvement which can be obtained with this inexpensive piece of apparatus.

The particular location is in an outlying business district consisting of a few filling stations, lunch rooms and residences. The distance from the distribution transformer to the location where voltmeter charts were taken was about 500 feet. The secondaries were three-wire with No. 4 and No. 6 copper. The distribution transformer is a 10 kva. and the auto transformer has an output capacity of 2 kva. The two voltage charts in the Fig. 1, show the conditions which existed when the auto transformer was connected and when it was not. Decided improvement can be noted. The voltage is not perfect but was satisfactory for the customers in this locality. It it were not for the use of these auto transformers a much more

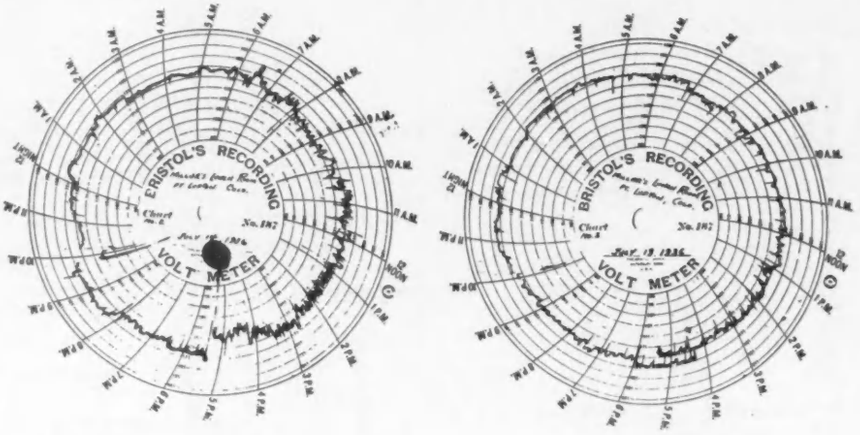


Fig. 1—Auto-transformers improve service on long feeders. (Left) voltage chart taken before corrective effect of auto-transformer was applied and (right) the same circuit after the installation of the auto-transformer

expensive method of correction would be required, such as larger copper or additional distribution transformer installations.

Modernization Improves Hydro Plant Efficiency

By L. M. ROBERTSON
Vice Chairman of Engineering Section, Rocky Mountain Electrical Association

THE rebuild of the Boulder Canyon Hydro Plant of the Public Service Company of Colorado, resulted in an increase in capacity of 43 per cent on the kilowatt rating and 78.5 per cent on the kva. rating, at a cost of $46.00 per additional kilowatt, or $25.00 per additional kva. This rebuild replaced the old switchgear, transformers, water wheels, regulators and generator fields, windings, and iron with the latest designs, resulting in increased efficiency and capacity.

Fig. 2 shows the plant as it was built originally in 1909, for a capacity at that time of 10,000 kw. It was designed primarily for system regulation and peak load capacity. The development included a dam for annual storage on the Boulder Creek, with a gravity line carrying water from the dam to a forebay.

In 1921 and 1922, the generators were rewound, giving the plant a capacity of 14,000 kw. and 16,000 kva. No other changes were made at that time as the water wheels were able to deliver this capacity, and the transformers and switchgear had some margin in design altho the plant capacity was limited to 14,000 kva. because of transformer capacity.

In 1935, it appeared that some of the old equipment was reaching the end of its useful life and that some replacements were necessary or failures might be expected. Studies showed that an increase in capacity of this plant would be very useful for carrying peak loads, which had increased considerably since

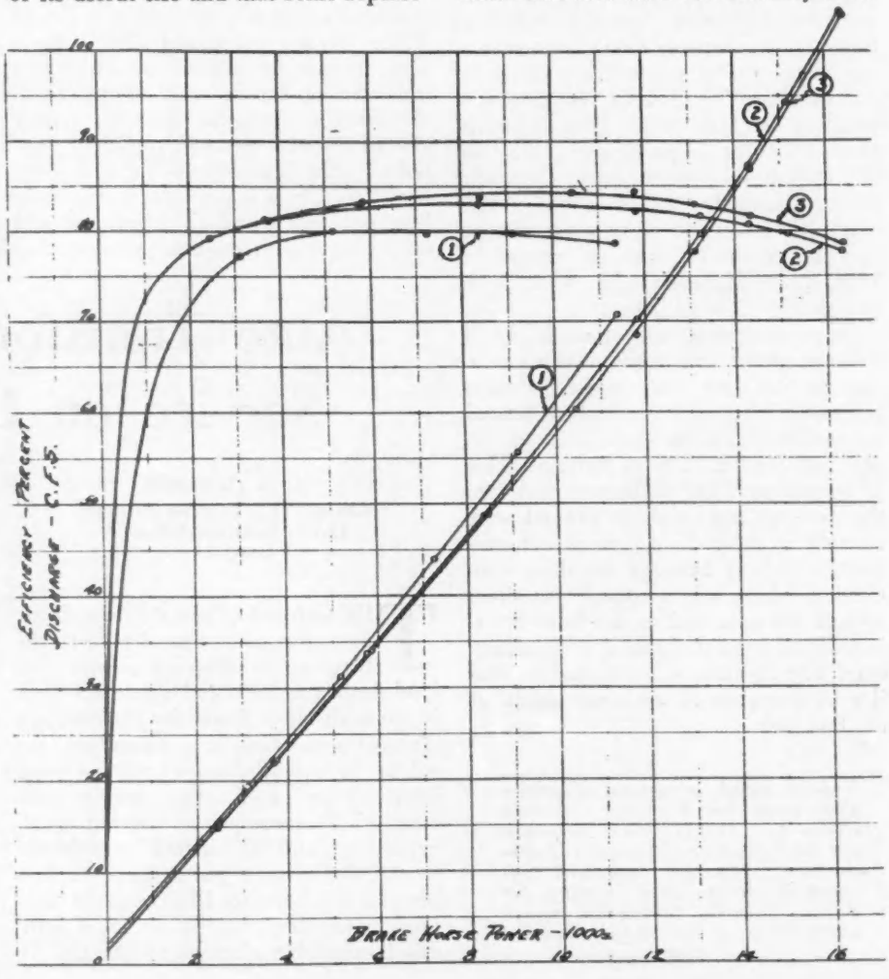


Fig. 1 — Efficiency and discharge curves before and after modernization. Curves No. 1 show conditions prior to rebuild. Curves No. 2 show conditions after replacing water wheels but before baffles were installed and curves No. 3 show conditions with new wheels and the baffles in place. Note gain both in efficiency and capacity

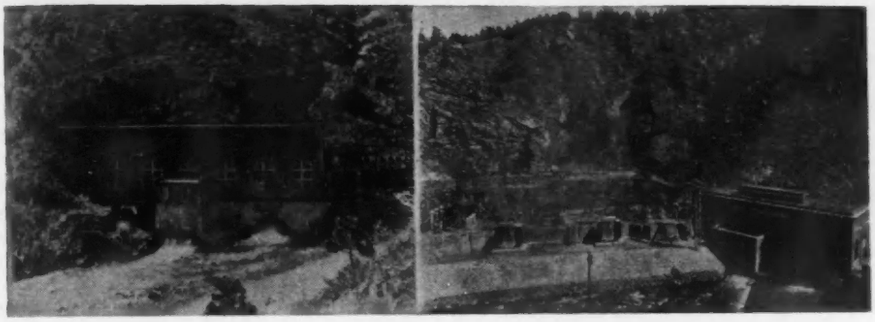


Fig. 2 — (left) Boulder Canyon Hydro Plant before modernization which increased its efficiency and capacity. Fig. 3 — (right) after modernization which included major rebuilding of units, the addition of outdoor switching and a new building ventilation system

1909. The investigations revealed that the cost of the larger capacity would be only slightly more than the cost of straight replacement, and some tests made on the penstocks showed that 20,000 kw. could be generated at this plant.

The old shaft and exciters had been designed for double the size required by the generators at that time, and they were found to be suitable for a plant output of 25,000 kva. at zero power factor, that is, with the machines operating as synchronous condensers. Therefore, a replacement of the exciters was not necessary. However, it was found desirable to add pilot exciters and new regulators and rheostats to provide the necessary range of control, and give a quick response voltage regulating medium.

The manufacturer of the generators worked out a design, such that by changing the stator iron, coils, field poles and field structure, the rating of the new machines as synchronous condensers could be made 12,500 kva. each, or a plant rating of 25,000 kva., or 20,000 kw., 80 per cent power factor. This was accomplished without the addition of coolers and other auxiliary equipment.

It was felt desirable to improve the ventilation of the plant in order to reduce the temperatures in the building. The old wood sash in the windows was placed on the roof. These measures have accomplished the desired results.

In order to deliver the 20,000 kw. it was necessary to replace the original water wheels. This was necessary, not only for the increased capacity and improved efficiency but for the reason that the old wheels showed some mechanical troubles.

Fig. 2 shows the results of efficiency tests made on the water wheels prior to the rebuild, and also on the new equipment. It can be noted that the capacity was increased from 11,400 brake horse power to 16,400 brake horse power. The efficiency, at 8,000 horse power, was increased from 80 per cent to 83 per cent. Some misgivings were felt regarding the size of the wheel case and it was found that after the installation of the new wheels considerable vibration was present in the case. A steel I-beam was placed on each side of the wheels in the case so that water from the buckets would be directed down to prevent fouling of the buckets. The tests indicated that this increased the efficiency for loads above 3,000 brake horse power. At 10,000 brake horse power the increase in efficiency was 1.4 per cent, as shown in Fig. 1.

The old transformers and switchgear had reached an age at which maintenance work was frequently required and failures might be expected. The old indoor water cooled transformers were replaced with a forced air type and located outdoors.

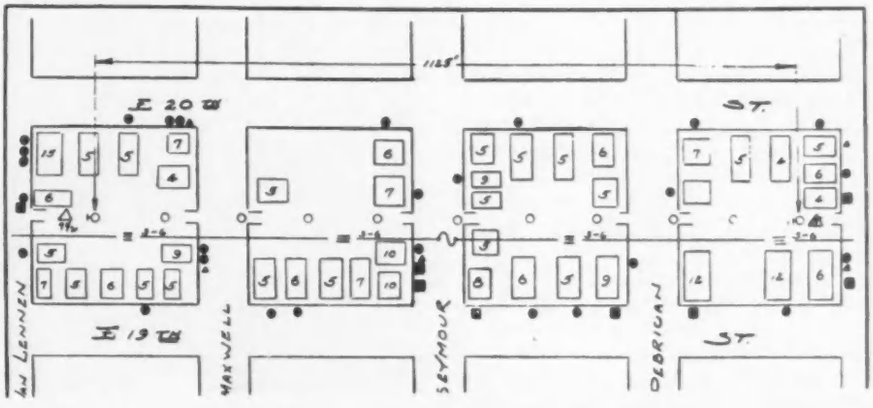
Experience Proves Value of Banking Transformers

By O. P. REED
Superintendent, Cheyenne Light, Fuel & Power Company

IT has been customary for a number of years to network the secondaries of lighting transformers in the Cheyenne territory. Lately there has been considerable interest both nationally and locally in networking of secondaries caused probably by growing refrigeration, range, water pumping and other heavy-duty appliances loads. Two types of network are in use, one being the so-called solidly connected network where the secondaries are continuous conductors and transformers are connected to the network through secondary fuses. The other type is the so-called loosely connected network, wherein transformers are connected solidly to the secondary lines and the secondaries are sectionized by fuses located at points midway between the transformers. The loosely connected network is the type used in Cheyenne. We wished to know for our own information the results of banking.

In the case selected, the transformers are approximately 1,100 ft. apart, the fuses are located approximately midway between the transformers and the conductors are No. 6 copper. The customer's loads are as shown, there being a total of 53 customers, of which 27 have electric refrigeration. There are

Fig. 1—View of section of distribution system showing the location and load of customers. Total appliance load is: hot plates 3; washers 19; radios 26; irons 27; percolators 16; vacuum cleaners 22; waffle irons 11, and toasters 22. Refrigerators, indicated by solid dots, total 27; ironers, by triangles, total 5; stokers by solid square, total 7. Numbers indicate rooms in the house



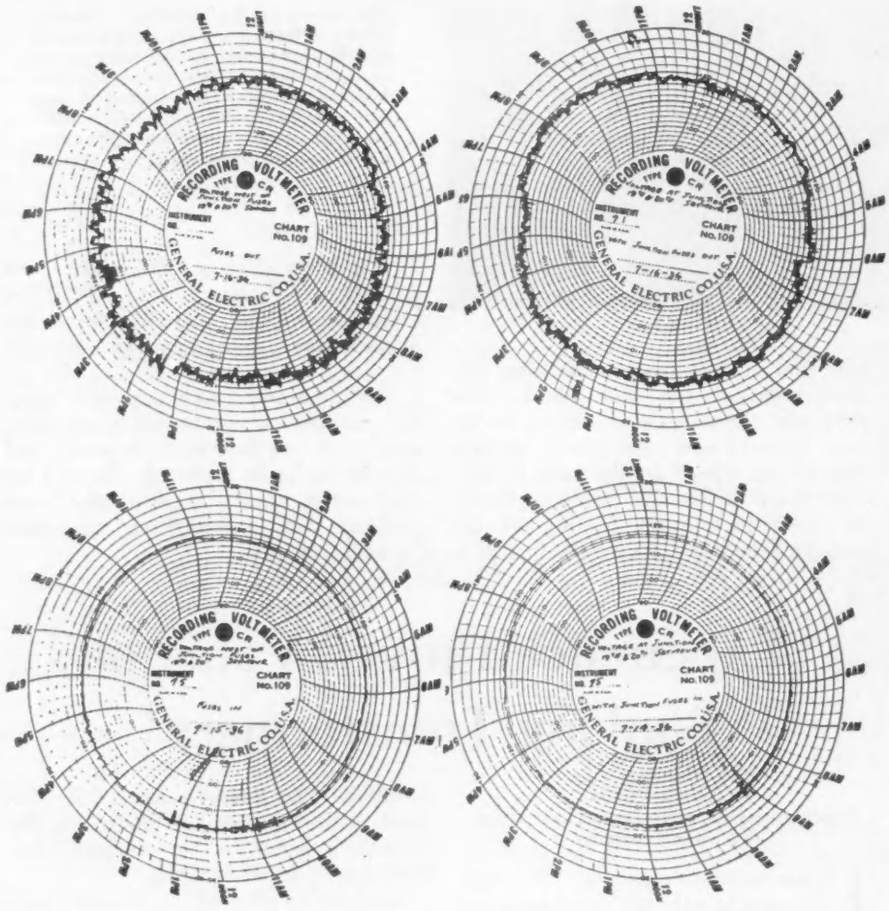


Fig. 1—Voltage charts for two points on the system. (Top) charts taken with fuses out and (bottom) charts with secondaries connected through fuses

also five mangles, seven stokers and one domestic water pump.

A decided improvement in voltage was experienced when the fuses were closed and the secondaries operated connected together, resulting in the transformers being banked. This connection can be made at a very low cost if the secondaries are close enough to make this feasible.

●

Portable Gin Pole For Faster Setting

Said to effect substantial reductions in time required for pole setting is a gin pole designed by Grover Leister, foreman for the Pacific Gas & Electric Co., San Francisco division. It is known as the Leister Portable Gin Pole.

Mounted upright on the side of a vehicle, it is constructed of selected wood, treated with linseed oil. It can be folded up on the side of the truck when not in use, and can be climbed, thus replacing many uses of the boatswain chair.

On high line construction, it has set 55- and 60-ft. poles at the rate of one every 7 min., with complete equipment of arms and insulators. At the San Francisco Presidio, four radio beacon poles, 105 ft. high, were set in six hours, employing but three men, and including time of raising, lowering and shifting the gin pole.

A 55-ft. pole being set with the Leister portable gin pole

Load Limiting Device Brings Lower Rate

Eliminating charges for large connected load operating at fractional capacity and permitting customers to pay on a basis of operating requirements is a load limiting device available through the Coast Counties Gas & Electric Co. It is provided for in the company's general power service schedule (P-1) as follows:

"Where the installation consists of 2 or more 3 phase motors, the customer may select any standard motor rating between 7½ and 40 hp. inclusive, but not less than the largest motor installed, which will then become the customer's connected load for the purpose of this schedule, and the company will at the consumer's expense install a suitable load limiting device which will prevent the use of loads exceeding the predetermined amount."

The device used is a Westinghouse Deion Line-starter with a modified relay re-setting device, placed in series with the customer's main disconnect switch and the load. The switch is installed, heater sizes checked, overload relay adjusted to current, and the switch sealed closed with a meter seal. It is suitable for small power accounts where short interruptions are unimportant. Re-setting may be automatic or manual. Approximate cost is $60 installed.

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New Books ...

A. S. T. M. Standards on Electrical Insulating Materials; published by the Committee on Electrical Insulating Materials of the American Society for Testing Materials, 260 S. Broad St., Philadelphia, Penn.; paper cover; $2. Based on 25 methods of test, 10 specifications, the 1936 edition includes revised tests covering varnishes, solid filling and treating compounds, sheet and plate materials, natural mica, untreated paper, insulating oils and varnished cloths and tapes. Revised specifications are presented on tapes, and standards given for rubber gloves and matting, cotton yarns, silk, cotton and rubber tape, pasted mica, slate, flexible varnish tubing and electrical porcelain.

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Storm Loading and Strength of Wood Pole Lines and a Study of Wind Gusts; by R. H. Sherlock and others; 183 pages; cloth bound; published by Edison Electric Institute, 420 Lexington Ave., New York; $2 to members, $5 to non-members. Contributing to the knowledge of overhead line structures, the book is based on research conducted over a period of several years, and represents the first intensive analysis of storm loading and strength during storms.

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Electrical Engineers' Handbook; Volume IV and V of the Wiley Handbook Series; Harold Pender, chief editor; Volume 4, Electric Power, $6; Volume V, Electric Communication and Electronics, $5. These two volumes, representing the third edition of the Wiley electrical handbooks, have been published to present comprehensively the variety of material which recently has been added to engineering knowledge. They are edited in accordance with the Wiley scheme of including general engineering fundamentals in a separate handbook, duplicating only enough essential tables to make each volume complete in itself.

The Boss Eats Across the Street

"I READ an ad in one of your magazines today," Electra said with a wicked gleam in her eye, indicating that there might be trouble ahead. "But it didn't make sense to me."

"So you're reading the ads," I replied. "I thought you were the little lady who didn't believe in advertising. Well how about that fur coat you were hinting about? *I* saw that advertised in the *Chronicle*. And I noticed you switched beauty lotions. Who gave you that idea?" If there was going to be an argument, I determined we might as well make it a good one.

"You know no advertisement ever influenced me to buy anything. But that's not the point and we're not going to start that fight all over again. This ad was different. It was about restaurants or something. It said, 'the boss of this place eats in the restaurant across the street.' I didn't read any more, because as I told you, it didn't sound logical or reasonable."

"You should have read the rest of it," I said to her. "Then you could have told me if it was talking about electrical people. Just for your own edification the ad in question was probably on the same theme as the moral about the bald-headed barber, the shoe maker's barefooted son and the dressmaker's shabby daughter. It probably went on to say that you can't expect the public to use your product unless you use it yourself.

"If only the people in the electrical business believed that! And if they would practice it! Selling the public on electric servants would then be easy. The favorable effect it has on the prospect when the salesman says, with convicition, 'I use one of these myself,' frequently is the thing which makes the ale. But I know hundreds of electrical people who cook with gas, patronize the iceman, and use just about every conceivable device competitive with the thing which contributes to their livelihood. And it isn't because they can't afford it either. They just don't believe in their own goods."

"Hey, wait a minute," Electra interrupted. "Before you start preaching, check up on your practicing. Your home is no electrical palace. A few more electrical gadgets might save me a little of that labor you're always talking about."

"I'll make you a small wager that our home is way above the average for most electrical people. Get a pencil and write down the ones we have. The list might surprise you. Are you ready? Auxiliary air heater, cigarette lighter, three clocks, door chimes, egg cooker, fan, iron, three I.E.S. lamps, an infra-red lamp, two mixers, three percolators, a popcorn popper, two radios, a range, a refrigerator, a sandwich toaster, soldering iron, toaster, vacuum cleaner, waffle iron, washer and water heater. How many does that make?"

"Before getting any totals, why don't you check to see if that's all," Electra replied. "I alway said that you don't know anything about your own house. Wait until I write down clothes dryer, heating pad and sewing machine."

"Well, you can't expect me to remember everything. Besides I never use any of those appliances. You have to admit though that it's an imposing list."

"It's not so hot when you compare it with that fellow in your office who has forty-seven appliances," she countered. "But how are you going to determine your rating in comparison to other electrical people?"

"You know those articles I write for Electrical West? Why can't we work out a blank form and ask the people who read my stuff to fill out the forms and mail them to me? Then we could work out some averages. They wouldn't have to sign their names unless they wished. You might donate a can of your famous icebox cookies to the one who has the most appliances in his or her home."

"If it will help any, I'll make the cookies for you. But didn't you want to make a wager a little while ago? I'll double the cookie recipe and make you eat one for every reply you get back from your readers. Since you got the idea that you are an author, you have become positively fatheaded. I'm probably the only one who reads what you write, and I do that so I can deflate your ego."

"There you go again, trying to start an argument. I've a good mind to break———"

"What?" she queried as she hit me with a magazine she had just picked up from the table besides her. I knew she wanted to start a fight when she began this conversation.

What Do YOU Use?

I have in my home the following electrical appliances:

Air Conditioner	Floor Polisher	Range
Air Heater (major)	Grill	Razor
Air Heater (auxiliary)	Hair Curler	Razor Sharpener
Biscuit Baker	Heating Pad	Refrigerator
Casserole Baker	Ice Cream Freezer	Roaster
Chafing Dish	Iron	Sandwich Toaster
Cigarette Lighter	Ironer	Sewing Machine
Clock	Lamps (I.E.S.)	Soldering Iron
Cookerpot	Lamps (Infra-red)	Toaster
Dishwasher	Lamps (sun)	Utility Motor
Dryer (clothes)	Milk Warmer	Vibrator
Dryer (hair)	Mixer	Vacuum Cleaner
Door Chimes	Percolator	Waffle Iron
Egg Cooker	Popcorn Popper	Washer
Fan	Radio	Water Heater

Average kw.-hr. per month.....

Affiliation: Power Company . . . Manufacturer . . . Wholesaler . . . Contractor . . . Retailer . . . Miscellaneous . . . (underline one)

Company Name.....

(Fill out and mail to Electra's Husband, Electrical West, 883 Mission St., San Francisco, Calif.)

With the Trade Associations + + +

[An Exchange of Plans and Ideas for Assisting the Industry in All Branches to Solve Some of Its Problems of Trade Relations and Business Ethics]

Martin *Langlais* *Boyd* *Butcher* *Stone*

N. E. C. A. Convenes at Sacramento

FACING increases in national dues and other problems of reorganization, the Northern California Chapter, National Electrical Contractors Assn., at its annual convention in Sacramento, Dec. 5, unanimously elected its most analytical business student and staunchest advocate of sound business conduct of contracting, as president during the next year.

Frank E. Boyd, Pacific Electric Motor Co., Oakland, over his own protest that he was too outspoken in his insistence that other branches of the industry observe sound business principles in dealings with the contractor, was elected. The convention would not accept his withdrawal from the nomination. Mr. Boyd succeeds Charles A. Langlais, of San Francisco, who has long been active in San Francisco association activities. This change takes the chairmanship of the chapter for the first time in several years, from San Francisco, where because of concentration of central office detail it was felt necessary before.

Other officers elected include Del O'Connor, of Lupen & Hawley, Sacramento, first vice-president; and Ted Curry, Curry Electric Co., Fresno, second vice-president. Edward Martin, Sterling Electric Co. was re-elected secretary-treasurer. On the executive committee, in addition to the above are H. H. Courtright, Valley Electrical Supply Co., Fresno; Roy Butcher, San Jose; Harry Eklund, San Rafael; Seth Cohn, San Mateo; Clyde Chamblin, San Francisco and Les Poland, Eureka.

Roy Butcher, chairman of the California State Contractors License Board, opened the program with a review of the activities of the Contractors License Board since its appointment about a year ago. He told of the limitations of the law as far as prequalification of contractors is concerned but showed how the new license applications, requiring sponsors to testify as to an applicant's business integrity, have resulted in refusal of 28 per cent of applicants. Furthermore 19 per cent of the remainder have applications returned for more detail. Since applications must be notarized, the making of a false statement on the application form constitutes perjury.

Achievements Cited

He told how, with the cooperation of the state insurance division, a check-up on workmen's compensation insurance had also been conducted. It was found, when the renewal of licenses was made last June, that about 38 per cent of the licensees were not carrying the proper compensation insurance.

Electrical contractors number 15,099 in the state, he said, the third largest group of subcontractors, the highest percentage being the painters. Butcher asked the support of the construction industry in revisions and improvements proposed in the Contractors License Act. These proposed improvements would stiffen up the provisions dealing with the diversion of funds and provide for basic examination before securing of a license.

Significant was his closing statement: "There is one thing we must all remember. We cannot raise the level of one craft any higher than that of the mother craft, namely, the general contractors, nor of the other crafts either. If a thing is good for the painting contractor, the general contractor, the plumbing contractor or the others, then, and then only, can it be good for the electrical contractor too." Support of the Contractors License Board and its work was voted unanimously in a resolution.

Business Realism

Before presenting a summary of the analysis of contractors' 1936 business standings, recently released by Dunn & Bradstreet, Frank E. Boyd spoke on "The Electrical Contractor Has Been a Business Man." In characteristic, plain-spoken fashon, he pointed out that most contractors have weathered the worst depression in history because of their realistic attitude toward their business and their refusal to undertake cooperative industry programs unless they were profitable. "The prime motive in business is to acquire life's necessities," he said, "provide for the future and secure a reasonable share of luxuries. To do these things through contracting is a test of one's business ability. The percentage of contractors who succeed is as large as in most other businesses, and we can take pride in our accomplishments. Our selfish interests have not occupied all our attention for we have shown patience and tolerance about our problems and have contributed much to the electrical industry's achievements." The need for strengthening margins to take care of the increases in operating costs due to Social Security taxes are emphasized.

In discussion of actual operation of the Earl Peak program of industry coordination H. H. Courtright opened with a description of what the various

groups in the San Joaquin Valley are doing to derive more business for the entire electrical industry. He was followed by Tom Robinson, of Fresno, who told of the formation of an industry coordinating committee and of its determined effort to handle every problem constructively.

A. L. Stone, Stone Electric Supply Co., Los Angeles, newly appointed executive committeeman to N.E.C.A from the states of California, Arizona and Nevada, told of the operation of the Peak plan in southern California chiefly through the Electrical Development League. He told of the cooperation between the various branches of the industry in working out a new Los Angeles ordinance. He also described the recent Electrical Show and the insistence of contractors that the wiring be handled by the contractors' association, which was done. He spoke of the plans for 1937 of the League in which a $10,000 program is to be financed jointly by the industry for the promotion of adequate wiring. Joe Newitt, secretary of the Los Angeles Electrical Contractors Assn., Ed Chandler as well as Herbert Evans, Nicholas Electric Co., Los Angeles, all members of the delegation to the Northern Chapter meeting, each spoke, telling of some phase of the cooperative program in southern California.

Del O'Connor, Sacramento, told of the bid depository system being used in Sacramento and of association conditions. After the election Mr. Stone spoke of the national convention of the N.E.C.A. at Atlanta, told of the new program for dues to finance the national association, announced his intention to attend the executive committee meeting in January and announced plans to hold the national convention in Los Angeles and make this a tour of the Pacific Coast next year. A tentative itinerary of the convention calls for the making up of special trains to leave Chicago Oct. 12, 1937, arrivng at Grand Canyon Oct. 14, Kingman, Ariz., Oct. 15, for a visit to Boulder Dam and then the convention business session itself in Los Angeles Oct. 18 to 21. From there will be conducted a trip to Yosemite Valley, will visit San Francisco Oct. 24 with a meeting at Hotel Clift. The trains will then go to Portland, arriving the 27th, with a meeting again in Seattle on the 28th and in Spokane on the 29th, returning to Chicago Oct. 31. Stone urged full cooperation of contractors throughout the Western territory in making the visit of the delegates from the east an outstanding one to the Pacific Coast.

No action was taken in regard to national dues, pending Mr. Stone's trip to the executive committee meeting in January.

L. A. Contractors Elect Officers for 1937

Officers of the Los Angeles Electrical Contractors Assn. for 1937 have been announced as follows: president, A. L. Stone, Stone Electric Supply Co., Los Angeles; vice-president, H. L. Evans, Nicholas Electric Co.; treasurer, F. R. Ulbrick; secretary, J. J. Newitt, with the following as directors: George DeAth, L. W. Mills, J. E. Chandler and S. F. Hill.

Two services for members are being undertaken by the association, the first, a collection service, the second a medical service for members and their employees, based on a nominal charge.

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Remember When—

Cap Kenney, prominent San Francisco electrical contractor, looked like this? Those were the days of the carbon lamp, wooden moulding and fused rosettes in the ceiling. This treasure came to light because C. B. Kenney moved recently into a new home and one of the family album pictures fell out

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Oil Coordinator Becomes Contractors' Manager

Clyde L. Chamblin, president, San Francisco Electrical Contractors Assn., has announced the engagement of Paul Riley as manager of the association, beginning Jan. 1. Mr. Riley will be the first manager the association has had since 1930. Management of the organization has been by the voluntary effort of officers and members ever since that time.

Mr. Riley, a graduate of West Point, was youngest major in the A.E.F. in which he served in the intelligence division. His army experience includes infantry, coast defense and during the early part of the war in charge of contracts and building materials for the war department in connection with his regiment. He was awarded the Croix de Guerre and two American citations. "This," said Mr. Chamblin, "should qualify him for some of our toughest contractor problems. We need a man who can take it in this association."

After resigning from the service he was sales and merchandise manager for Vacuum Oil Co. in the Southwest, later joining a firm of consulting production and marketing engineers in Kansas City, Mo. During NRA days he served as coordinator for the Pacific Coast petroleum industry, and assisted in forming the marketing and sales policies of the oil industry which were in effect until the demise of the NRA. Many of these policies are still in effect and are proving profitable to the oil industry. He was active in eliminating oil service stations from the chain store tax bill and later acted with the Chain Store Assn. in organizing and coordinating efforts for the defeat of the chain store tax measure in the November election.

"Speaking for the board of directors," said Clyde Chamblin, "we feel that Mr. Riley will be able to devote himself to a constructive program for improving competitive and business conditions in our contracting industry." An industry meeting in January at the occasion of inauguration of new officers will afford the industry at large in northern California an opportunity to meet the new manager of the organization.

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Contractors Directory Also Contains Report

With the issuance of its official directory of licensed contractors of California, the Registrar of Contractors has added to the cross-indexed list of names and addresses of licensees much information of an informative nature to assist in understanding the contractors' license act and its operation.

Besides the directory the latest edition contains a message from Governor Frank F. Merriam and articles from Director William G. Bonelli, of the department of professional and vocational standards; Roy N. Butcher, chairman of the Contractors State License Board; Earl F. Anderson, executive secretary and registrar and Glenn V. Slater, assistant registrar. Included are a progress report of the board and facts and figures relative to contractors of various classifications. A copy of the license law is also included.

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• THE QUALIFIED CONTRACTOR is the name of the new bulletin being published and distributed to members of the National Electrical Contractors Assn. Its first volume and number was issued August, 1936. Similar in purpose to the "N.E.C.A. News" which was issued during code days, the bulletin devotes itself entirely to contractor and Association material and is to act as a forum of discussion between members on contractors' problems. Lawrence W. Davis, manager, N.E.C.A, is editor of the bulletin.

EDITORIAL + + +

Hail 1937

HERE in the West the electrical industry bade good-bye to 1936 as one parts with a good friend, better in every respect because of a year of happy relationship. And the industry can welcome 1937 as one greets a new acquaintance who comes highly recommended. The New Year promises to bring with it more profits, greater sales, more load, and more security and prosperity than any in the electrical history of this region. Just as 1936 brought larger opportunities, and marked improvement over its predecessors, so does 1937 portend greater forward progress. Reviewing the past twelve months and projecting the present trends, leads to the following predictions regarding the coming year:

1. Electric energy requirements of every class of customer are exceeding all previous highs. Utility loads are at new peaks. With facilities straining to carry present load and with new load in the offing, the industry is assured of an era of system expansion and reconstruction. Engineers will again be busy planning and building. Orders will flow from purchasing departments to manufacturers and wholesalers. Here is justification for optimism and enthusiasm.

2. Electricity's role of universal servant in the home is winning more and more acceptance from the public. By coupling this demand with intelligent, planned sales efforts, the industry in the West sold a record volume of domestic appliances in 1936—estimated to approach the substantial figure of $100,000,000. There will be no ground lost in the months to come. Sales efforts will be even more intensified if anything. Reports show budget increases for all territories, particularly for ranges, refrigerators, laundry equipment, water heaters. Alert retailers, distributors and manufacturers will win increased profits; utilities more load.

3. Contractors and wholesalers have every reason for increasing optimism from the spurt shown by building construction. In eleven months of 1936 permits issued in eight Western states reached $175,000,000. This is a gain of 76 per cent over the previous year, 232 per cent over 1934. During the depression an estimated housing shortage equivalent to $29,000,000,000 accumulated all over the U. S. At least 10 per cent of this was in the West. New construction and modernization will continue to put money into the pockets of all branches of the industry during 1937.

4. Finally there are the economic possibilities of this Western empire. On this present rising tide of business, those who live in the West and have faith in its possibilities begin to envision potentialities that are beyond the comprehension of even our own professional optimists. Resources and markets still undeveloped; an abundance of opportunities; an increasing population; a stable agriculture unlimited in its diversity; incomparable recreational facilities—all these add up to untold possibilities for further progress. And in all of this electricity must play an increasingly important part.

However, lest we be accused of gilding the lily, it is well to point briefly to those few underlying unfavorable factors which might influence this bright outlook. There is the undercurrent of labor unrest. Fortunately our industry has been free from disputes, perhaps because it is more human, more enlightened, more closely knit than others. But it may be caught in the backwash of labor troubles in other fields. Public hostility toward the utilities, fostered by political bally-hoo, is a threat in a few localities. But there is definite proof that the temper of the public is changing along with the business upswing. Increasing use of electricity which permits lower charges for service is one antidote for this. Higher costs of doing business are in prospect. These can be offset by greater efficiency. None of these are insurmountable obstacles.

Thus the electrical industry greets the New Year with the definite promise of still greater opportunities and achievements ahead. The men and women who comprise the industry can look forward confidently to that universal New Year's wish, prosperity and happiness.

Fair Trade Act Sustained

ARIZONA, since the California and Illinois Fair Trade Acts have been upheld by the U. S. Supreme Court, is the first state to enact similar legislation. It is to be expected that as other western states' legislatures convene, the same law may be adopted quite generally.

This law, now that uncertainty regarding it has been settled, has some important potentialities. Primarily it has been thought of as a measure to insure a manufacturer of trade-marked and advertised brands, such as appliances, that his contract price with the retailers shall be respected. Its provisions carry even to those with whom no contract has been entered into, those who by purchase of brand merchandise at distress sale have been able to jeopardize both the manufacturer and the contracted retailers by dumping such brands at cut prices on the market.

It is an interesting point that the Supreme Court has made in its decision. The law is not a price fixing measure. It applies only to branded or trademarked commodities which are in fair and open competition with commodities of the same general class

produced by others. Hence the law is not in support of any restraint of trade. But it recognizes that a manufacturer does have a definite value in his brand name and trade mark, which by extensive advertising and careful manufacture he has been able to create. To jeopardize this asset of goodwill is to damage the manufacturer. It is upon this premise of damage that the decision was made.

Since the product is still in open competition, the price will remain subject to the pressure of that competition. It is held only that the advertised name and price, which is therefore a definite standard of quality, shall not be used unfairly to entice sales of that same product at a lower price and do injury both to other contracted retailers and to the manufacturer who must continue to depend on their goodwill.

Although this act has been considered to be of benefit chiefly to makers of appliances, there is no reason, legal students say, why it cannot be made to apply to trade-marked conduit, wire, fittings, or other equipment. Such trade-marked materials will always be subject to the competition of off-brand or untrade-marked goods, but there is no reason why the trade-marked, nationally advertised brands which build up acceptance and demand for their products by missionary work and publicity, should not use this legislation to protect their products and their contracted outlets from the destructive price cutting which has so often injured them.

Like any legislation, the value of this law will be dependent upon its use. Now that the industry, in common with other industries, has this weapon of defense, legally sustained, it will do well to employ it to raise the standard of business conduct and to derive its own legitimate profit from its costly promotional effort.

Speaking About Weather—

HAD Mark Twain reckoned on the electrical industry, he might not have been so positive when he made his famous statement that everyone talks about the weather but no one does much about it. Had he known just how important an element the weather would be to an aggressive young industry that had ambitious plans for utilizing the country's rivers and streams, he would have prophesied that someday somebody would make "weather" something other than a topic for idle conversation.

While it is still impossible to actually control precipitation the electrical industry in the West has found it possible to "do something about the weather" as evidenced by the ability of western system to meet record demands during an abnormally dry fall. Such conditions demonstrate the wisdom of coordinated engineering which not only dictates keeping older steam plants on cold standby for just such emergencies but also justifies the expensive works incident to the maximum utilization of run-off. Some utilities have found it necessary to steam up plants that have been shut down for six or seven years.

The fact that it *is* necessary to do something about the weather and that it *is* wise to keep older plants ready for periodic deficiencies in rainfall is sometimes overlooked by those who would try to evaluate busbar costs of kilowatt-hours. It is easy to overlook the costs of last winter's snow surveys, the expense of stream gaging stations and the numerous other items which permit efficient production the following fall. It is expected that the superficial observer might criticize the wisdom of maintaining the small, technically obsolete steam plant in operating condition. Yet these and other similar costs incurred by the large public service system return thousand-fold dividends to the customer by making possible reliable, continuous service at the low rates this section enjoys.

It is not improbable that the general public interest in the weather can be converted to still greater benefits. Characteristic of its progressive attitude, the electrical industry has done still more about weather by giving its customers the means to manufacture climatic conditions to suit individual tastes. Through the modern alchemy of the kilowatt-hour, last winter's snow or today's fuel can be converted into the uniform atmospheric conditions conducive to maximum personal comfort. As air conditioning applications increase, as they undoubtedly will, they will cause the coincident growth in electrical usage that will lower the customers already low cost of energy. Already people are talking not about the weather but what they intend to do about it.

Razors Sell Wiring

PROOF that *use* sells where mechanical details fail is contained in the national advertising of one of the electric razor manufacturers. The manager of the Sir Francis Drake Hotel, in San Francisco, in a signed letter, says that so great was the demand from his guests for an outlet for the use of an electric razor that the 600 bathrooms in his hotel were wired for an outlet to serve them.

How much argument and talk about wire and capacities and any other technical details would it have taken to persuade this business man of the need for such outlets? Yet a little razor, drawing but four watts of electricity, and playing hob with radio interference to boot, by popular demand has forced the wiring of 600 bathrooms with an electric outlet.

Isn't there a clue in this incident to the way to sell adequate wiring to the millions of homes both new and old? Wiring is a means to an end. It may be hard to sell the means, but if the end is made sufficiently attractive, the means must be provided. The electric razor deserves a vote of thanks, not only from those with tough beards, but also from the industry.

Significant Trends + + +

[Signposts which point the road to improved business or method, brief, pertinent, useful hints as to HOW someone has blazed a new trail]

Monorail Crane System Speeds Shop Handling

TWO main considerations in the operation of any electrical service and repair shop are the quality of the work and the cost of operation. The quality of the work depends principally upon the skill of the workmen, upon competent supervision, and to a large extent, upon the proper equipment. In the design of its new shop, and addition to its plant, Norton & Norton Electric Co., Ltd., Los Angeles, considered all factors with special attention to the arrangement of operations and to the handling equipment. It was felt for many years by the Nortons that startling results could be obtained if a shop could be built from the ground up with no other thought in mind than the servicing of electrical apparatus, but this was the first opportunity they ever had to try out this belief without restriction.

The shop building itself is 50 ft. wide by about 150 ft. deep with an annex at the rear 20 ft. deep extending the full 50 ft. across. The floor of the shop is about 3½ ft. higher than the street level, and the building begins far enough back from the street so that large trucks are entirely off the sidewalk when loading. The loading dock extends the full width of the building which provides space for customer parking as well as plenty of space for truck loading. A slot extends into the bulding on one side of the loading dock in which trucks with heavy equipment can drive under the crane.

The crane is of the monorail type with three tons capacity and runs entirely around the building, about 8 ft. from all walls. It also runs out of the main building at the rear and into the annex, covering every regular shop operation.

"The monorail crane is the best system we could find which would permit work to be handled from the truck and extend over practically every operation in the shop and back to the truck without any transfers," said Tom Norton. "Also the crane can be used in different parts of the shop simultaneously as there are three separate hoist carriages. We find that a man can push easily a 3-ton load with one hand as fast as he cares to walk. The monorail crane is supplemented with platforms and hydraulic hoists, and with portable cranes to reach over some of the machine tools that are not under the crane system."

An unique part of the new shop is the annex which consists of 4 concrete rooms with a 9 ft. passageway running in front of all of them. In these four rooms, all preliminary operations are concentrated. The cleaning room has an Oakite tank set in a pit with the top slightly higher than the floor. The solution is kept boiling in the tank and is quite effective in cleaning all paint, grease, and removing insulation from the frames. This room also has a fireplace where insulation is burned from the motors making the frames easier to strip. The disagreeable fumes are carried up the chimney. After the frames are cleaned, they are washed off with fresh water in this room also.

The second room contains the baking oven which is thermostatically controlled to maintan any temperature desired.

The third room contains the tanks of insulating varnish in which motors and transformers are immersed. Space is provided in this room also for the vac-

The new addition at one side of the former main shop building provides a parking and loading space off of busily traveled Broadway for customers' cars and trucks

All of the new wing is devoted to the new shop and shipping department. The monorail which serves the entire plant can be seen suspended from the ceiling

uum tank equipment. The entire equipment in this room is set below floor level so that the tops of the tanks are about a foot above the floor.

Paint Shop

The fourth room is the paint room. Equipment in which the electrical winding is to be saved is cleaned in this room also. Such equipment is set on a grating which covers a pit. The pit contains a pan which catches the cleaning solvent, grease, etc., and this pan is emptied every night. The monorail crane, through a system of switches, covers all these operations in the annex with a minimum of handling time.

Test Board

The testing switchboard extends across the back of the main building. Capacity for testing 200 hp. under full load is provided. Alternating current at 2300 volts, 440 volts, and 220 volts, 3 phase, is available at all times, as well as 220 volts and 110 volts, 1 phase, and direct current of standard voltages. Alternating current at 220 volts, 3 phase and 220 volts and 110 volts, 1 phase, are also available at all winding benches for preliminary testing. Motors are tested under load by use of a direct current generator, separately excited and calibrated for its own losses at various speeds and excitations. The usual variable, high voltage transformer for ground tests, and other standard equipment are also available. The disconnect switches and the magnetic switches for the shop's own motors are located on this board too, with push buttons at the various machines.

Transformer Winder

A machine, especially designed by Norton & Norton Electric Co., for winding transformers up to 500 kva was installed with very satisfactory results. This machine will operate at any speed from 3 to 300 r.p.m., and it is arranged to operate with a foot pedal, starting as slowly as desired. A magnetic brake maintains the tension on the wire while starting and stopping. This machine will wind either core or shell type transformers with equal efficiency and it is sufficiently flexible to handle any make of transformer.

The crane extends over the transformer winder, the lathes, some of the winding benches, in front of the switchboard, and over a space reserved for assembling and dismantling. The insulation cutters, coil winders, taping bench, milling machine, shaper, drill presses, hydraulic press, etc., are not under the crane. Portable cranes are used when necessary in these operatons.

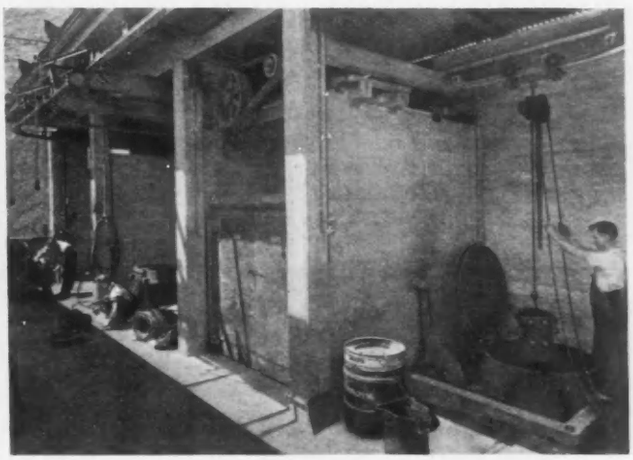
Considerable thought was given to the arrangement of the operations so as to eliminate, so far as possible, the necessity for back tracking, and to lessen the distance between operations. The insulation cutters are adjacent to the winding benches, and the insulation materials are carried in a rack beside the cutters. The coil winders and the taping bench are adjacent to each other, and opposite the stock room counter. All wire and special tools are kept in the stock room. The stock room counter is opposite the middle of the shop and is about 20 ft. from the coil winders. Equipment such as the lead burning transformer, welder, and transformer oil filter are portable.

"At the rear of the main shop building, an employees lounge was built in a separate building, with lockers, showers, and a lounging room," said Mr. Norton. "This, we believe, has been well worth the investment.

Cost Estimate

"Due to the rise in the wage scale and increased material costs, it is practically impossible to determine the exact percentage of reduced costs in the new shop over the average job cost in the old shop, but we estimate this to be approximately ten per cent. The greatest benefits, however, are noticed in a decided improvement in the quality of all the work, and in a much smoother flow from the receiving department through all the operations and back to the shipping clerk."

In the large area that used to be the shop are now displayed the reconditioned motors, pulleys, control and other electrical equipment, etc. Not shown but at the right of the picture is the large stock room and a new "Elecrical Wholesale Mart" where industrials may purchase wiring materials at wholesale



Cleaning, stripping, dipping, baking and painting is done in this series of rooms at the rear of the repair shop. The monorail system serves all of this section. Note the heated Oakite tank, mounted below the floor level, at the right; the bake oven in the center, and the painting and stripping rooms at the left

• Demonstrating that Complete Shop facilities and experienced engineering for industrial plants are available from private electrical contracting shops, the Pacific Electric Motor Co., Oakland, devoted the latest issue of its "Industrial Electric News" to pictures and descriptions of its facilities. The photographs and their captions tell a complete story of facilities to repair and rebuild all types of electrical equipment. A box in the center tells that local service saves time and money.

News of Note + + +

Northwest Plants Need Water

Recalling the crisis of 1929, when the aircraft carrier Lexington furnished energy for Northwest homes, the area last month confronted its dryest season in seven years and its heaviest loads in history. Rainfall at Seattle during September, October and November, was but a third of normal.

Puget Sound Power & Light Co. is generating by steam at Shuffleton plant, and steam is carrying one-third of its load. Seattle City light estimated 2 in. of rain needed to dispense with steam generation.

Portland General Electric Co. reported hydro generation down 50 per cent in late fall. Water level at Lake Merwin behind Ariel Dam of the Northwestern Electric Co. has been drawn down 65 ft. to the lowest point in its history. Demonstrating the value of adequate standby's, the experience recalls that at least one such plant was declared no longer useful in the public service a few years ago by Oregon's public utilities commissioner.

Although water is low, more rainfall than in 1929 and availability of new plants make another shortage improbable. Comparative rainfall figures in Seattle for the fall months are: normal, 9.29 in.; 1929, 2.32 in.; 1936, 3.33 in.

In California, last year's heavy Sierra snows plus large storage facilities have preserved adequate stream flow.

Shortage in this area would appear in fall 1938, only should this and next winter both continue to be extremely dry.

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Japanese Plan Lamp Works in British Columbia

A $250,000 plant for the manufacture of electric light bulbs is planned in Vancouver by the Fuso Electrical Manufacturing Co. of Tokyo, Japan, according to Hayashi Isobe, general manager, who was recently in Vancouver looking over sites. He said construction will start next spring.

The plant, said Mr. Isobe, will be financed by Canadian and Japanese capital in about equal proportions, and will have a capacity of approximately 20,000 lamps a day. Canadian workers will be employed. More than 50 per cent of the parts will be manufactured in Vancouver, the balance to be brought from Japan and assembled at the plant. Automatic machines are to be imported. The product will be for distributon and sale in Canada.

The company, which has been exporting lamps to Canada for five years, has an action pending in the Exchequer Court of Canada seeking declaration that its lamps are not an infringement on patents held by the Canadian General Electric Co.

The latter company has claimed infringement, said Mr. Isobe. He said Fuso lamps are fabricated under Canadian and world patents held by his company. The action started by his company is an effort to establish rights to manufacture in Canada in tariff-free competition with other Canadian and American manufactures.

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State Water Authority Protests PG&E Plants

Pending with the Federal Power Commission is an application by the Pacific Gas & Electric Co. to build hydro-electric plants at six sites on the Feather River. Last month the California Water Authority threatened a protest to the Commission unless the company would agree to harmonize its program with the Central Valleys Project.

The protest was filed despite assurances of P. M. Downing, vice-president and general manager of P. G. & E., that his company has no intention of hindering or delaying the project.

"We have a moral and legal obligation to perform," Downing said. "We cannot refuse to take on new business. We find ourselves in the position where we have the State Railroad Commission telling us we must fulfill our obligations, and another State agency protesting our plans to make this possible."

Slide Demolishes Puget Sound Hydro Plant

The Electron hydro plant of the Puget Sound Power & Light Co., located on the Puyallup River near the mouth of a precipitous canyon, was shattered by a landslide Nov. 23.

A diversion dam, located 10 miles above the power plant, turns river water into a wooden flume which discharges into an artificial reservoir immediately above the plant. Five steel penstocks bring the water to the units.

About 10:30 p.m. a large piece of the hillside slid from its position near the top of the hill behind the power house at the reservoir site into a ravine which is more or less parallel to the penstock from this. This material, augmented by more as it went down the very steep hillside, struck the back of the power house with sufficient impact to completely demolish this upper structure. In its journey, the slide broke one of the small penstocks near the power house, water discharged from this break undoubtedly increasing the intensity of the slide as it struck the building. Debris from the slide completely buried the four generators having a total capacity of 21,000 kw. installed on the bottom floor of the power house. The slide also buried the the transformer cells on the main floor of the plant. Until the debris from the slide can be removed, the condition of machinery and transformers cannot be determined.

Investigation to date has not disclosed a reason for the slide. So far as is known conditions were no different than they had been since construction of the plant in 1903.

Oregon Planning Board Reports on Bonneville

"Recommended Policies for Sale of Bonneville Power" is the latest report of the Oregon State Planning Board, setting forth the necessity for early congressional legislation concernng operation of the Columbia River project. Submitted to General Charles H. Martin, governor of Oregon, the report was approved and forwarded to Oregon's congressional delegation and the Federal Power Commission.

Drawing its recommendations chiefly from three previous reports*, it urges congress to: (1) determine Federal policies of operation and administration, (2) fix rates for power sale and provide for contracting, and (3) provide for a survey of possible power markets.

It also recommends: (1) making a large quantity of power available near the plant at lowest feasible wholesale cost, (2) basing rates at a distance on generation cost plus transmission cost, (3) government control of resale rates, savings to ultimate consumers, (4) granting preference of power purchase to public agencies with half the output reserved for them for "two or three years," and (5) endeavoring to effect quick absorption of full output.

The Mid-Columbia Chamber of Commerce recently passed substantially similar resolutions, but emphasized basing rates, not on pooled transmission costs, but on transmission to a particular locality, thus giving nearby towns a geographical advantage.

Washington, D. C. Correspondence—One of the first bills upon which Congress is likely to act at the forthcoming session is a measure to provide for the operation of Bonneville dam and sale of power therefrom. It is expected that the bill will provide for operation by the Corps of Engineers with the Federal Power Committee approving contracts and rates.

* "A Study of the Wholesale Cost of Bonneville Power, December, 1935," "Investigation of Data Pertaining to Possible Uses for Bonneville Power, April, 1936", "Use of Electricity in Oregon with Forecast of Future Demands, September, 1936."

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• PERMISSION TO CONSOLIDATE the Yamhill Electric Co. and Molalla Electric Co., wth their parent company, Portland General Electric Co., was granted recently by the Oregon Commissioner of Public Utilities. Both systems, serving territory contiguous to that of the parent company, are wholly owned by the parent company, from which they purchase power. The Yamhill unit serves extensive rural areas in Washington, Marion and Yamhill Counties. The Molalla unit serves smaller rural territory about Aurora, Clackamas County. A. L. Strickland is vice-president and general manager of both.

The Standard News

January 1937 — Electrical Edition

Published by THE STANDARD ELECTRIC STOVE CO., Toledo, Ohio

Dealers Who Get Their Share

With the rapid increase in the sale of electric ranges it is going to be interesting to watch the trend in retail merchandising.

A certain number of dealers will step out and get their share. A certain number will allow this business to go to a new crop of merchandisers not now selling electric ranges.

Selling electric ranges is easy. It used to be difficult, when rates were high and when electric cookery was slow. But now rates make cooking with electricity as inexpensive as with any other fuel, and the speed of electric ranges is second to none.

I have always found that the dealer in any commodity who establishes himself unmistakably in the sale of that commodity gets his share of the business. By this I mean that the dealer who will go wholeheartedly into the business, make a study of it, and actually stock enough models to show a selection will just automatically be recognized as headquarters.

You know how you feel about it yourself. If you want to buy an article that costs you $100 you are going to look them over, and I mean LOOK THEM OVER. I know a number of cases where dealers just dominated the market by force of number of models on the sales floor. The prospective customer got the right impression from the start—"Here is a dealer who has confidence in what he sells; here is a place where I can see enough models to make a selection."

Yes, it is going to be interesting—in fact, it is already interesting to see dealers in small towns stocking four or five models and making a business of selling the most modern representation of the oldest device in household use, the device that cooks our foods. Every house must have a cook stove. The replacement business alone is over one and one half million stoves a year. How can such a market be ignored?

CHARLES A. PIERSON.

Commercial Cookery

We are all worked up in the industry about the great sale of electric ranges for home use. But let's not overlook the market in restaurants, clubs, barbecues, hotels, etc.

Standard made its first commercial range over 22 years ago. There has never been a time in Standard history when it did not have a full assortment of ranges for cooking for large groups. We now have four different series of ranges for different classes of heavy duty trade. Watch for this class of business.

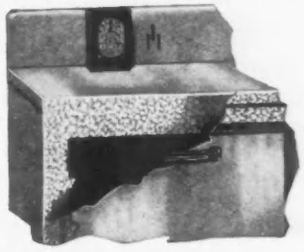
Why Standards Last as Long as You Wish to Use Them

We have often been asked, "How long will a Standard last?" Our answer is, "Just as long as you wish to use it." That is not stretching it an iota.

For instance, the hinge and spring on the Standard range is break-proof. That is, not one has ever broken in service or in test. The gauge of the metal is heavy. It is all rust-proofed. The cooking tops are acid-proof. The bolts are tight and will not cause wear and tear by shaking loose.

All burners are designed for that extra service which is so many times demanded of them. They will stand overload. If you have to crowd your range to the limit for a large dinner party, it will measure up to the demand. It is made to do it by oversize in all parts.

Your Standard will last just as long as you wish to use it. We have proof of



this in many old ranges in use by housewives who do not wish to give them up.

Just Remember

A good thing to always remember is that you may have Efficient Standard Kalmax enclosed burners on your Standard at no extra charge. This gives you the greatest variety of surface burner selection in the whole industry. The cooker is also available on most Standards.

Also—Standard water heaters are made in their new styling, beautiful enough to fit into the finest kitchen. From 6 gallons to 120, completely automatic.

Write your nearest Distributor, or

THE STANDARD ELECTRIC STOVE COMPANY

Toledo, Ohio, U. S. A. Dept. C

Pac. Gas & Electric Co. Declares Dividend

A dividend of 50c a share on common stock for the last quarter of 1936, payable Jan. 15, 1937, to stock of record Dec. 31, 1936, was declared Dec. 16, by the board of directors. This brought declarations for the calendar year to $1.62½ a share, compared with $1.50 for 1935.

Expansion of business, largely offset by rate reductions and increased operating expenses affected earnings for the year, according to President James B. Black.

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Special Dividend Declared by Edison Co.

Directors of the Southern California Edison Co. Ltd., Dec. 18, declared the regular dividend on common stock of 37½ cents per share, and a special dividend of 12½ cents per share, both payable Feb. 15, 1937, to stockholders of record Jan. 20, 1937. The 12½-cent dividend also was declared on the original preferred stock, payable Apr. 15, 1937, to stockholders of record March 20, 1937.

Commenting on the action, President Harry J. Bauer said unusually favorable conditions had prevailed during 1936. Water was plentiful, savings from refinancing were effective, and loss of wholesale load to the city of Los Angeles occurred several months later than expected. He pointed out that taxes of the company were approximately one million dollars more than those of any previous year.

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Yakima Voters Defeat Power Proposal by 6 to 1

Voters in Yakima, Wash., last month voted 4,713 to 723 against a proposal to purchase the distribution system of the Pacific Power & Light Co. Every precinct voted down the issue.

Rate reductions saving consumers of Yakima $60,000 annually recently have been effected by the company, and application for another reduction has been made. The chairman of a municipal light committee, which favored the proposal, was quoted as saying the issue would not be revived, but Grangers predicted submission of a county unit power plan two years hence. The county plan was defeated by a 10-per-cent margin last November.

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• SAN FRANCISCO'S PLAN SEVEN for municipal distribution of Hetch Hetchy power has received the approval of Secretary of the Interior Ickes. The plan calls for construction of a new power plant at Red Mountain Bar and acquisition of the Pacific Gas & Electric Co.'s distribution system in the city. Several plans were previously rejected as being in conflict with the Raker Act. The city's board of supervisors, following the approval, voted 9 to 2 to place a $50,000,000 revenue-bond issue before voters at an election probably to be held next month.

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Bond Election Set in Fresno

To purchase the Fresno distribution system of the San Joaquin Light & Power Corp. a bond election has been set by the Fresno City Commission for Feb. 25. Action was taken after the Pacific Gas & Electric Co. made no protest against the California Railroad Commission's $2,890,000 evaluation on Fresno distribution properties of its subsidiary.

The amount of bonds to be voted upon will be $100,000 greater, estimated as necessary to start the city in business.

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New REA Allotments Made in West

With more than $42,000,000 already lent or earmarked in 39 states and Alaska by the Rural Electrification Administration, the following allottments last month were announced in the West:

Tanner, Wash., Mutual Power & Light Assn., $13,000, 61 customers; Benton City, Wash., Public Utility District, $45,000, 155 customers; Plaza, Wash., Spokane County Rural Elec. Cooperative, $290,000, 600 customers (includes provision for 900-kw. diesel plant); Colfax, Wash., Whitman Rural Elec. Cooperative, $200,000, 680 customers (will purchase power from the Spokane cooperative); Jewell, Ore., Nehalem Valley Cooperative Elec. Assn., $65,000, 276 customers.

In Colorado, three projects are under way, one at Grand Junction to serve 600 farmers, and two in the San Luis Valley to serve 1,000 rural residents, all to purchase power from the Public Service Co. of Colorado.

Commissioners from 50 power districts* created in Washington State under the Bone power bill met in Seattle to form an association for obtaining rates from private power companies until power from Grand Coulee and Bonneville can be utilized, and also to consider taking advantage of the REA system and the building of generating plants.

• FOUR HUNDRED FARMERS, following the lead of Bonner County in northern Idaho, have formed the Latah County Rural Electrification Assn., for the purchase and distribution of power. Funds to construct 125 miles of transmission lines will be sought as a loan from REA.

* The 50 districts are located in 18 Washington Counties. King County, outside Seattle city limits, late last month secured 5,972 signatures to a petition sponsored by the Grange, forcing an election for a district there, probably to be held in March.

Corporation Headquarters Moved to Riverside

The Nevada-California Electric Corp., embracing five merged companies formerly its subsidiaries, will move its headquarters from Denver to Riverside, Calif., it was announced recently by company officials.

Heretofore only a holding company, the corporation will assume with the move actual operation of the Southern Sierras Power Co., Nevada-California Power Co., Yuma Utilities Co., Cain Irrigation Co. and Hillside Water Co. President A. B. West was expected to move to Riverside this month.

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Mountain States Co. Sues To Stop Bond Issue

Asking a preliminary injunction to restrain the city of Sandpoint, Idaho, from issuing any of the $300,000 bond issue authorized at an April 1936 election, for the construction of a municipal power project, the Mountain States Power Co. recently filed suit in the north Idaho superior court.

The company alleged in the complaint that the City abandoned its project and allowed its water rights on Priest River to lapse by not complying with requirements of its permit. It pointed out that the city has acquired no rights to the waters of Priest Lake because the 1927 Idaho legislature authorized the governor to appropriate in trust for the people of the State, all of the unappropriated waters of the lake, and that such appropriation was made. The complaint further alleges that the sale of a portion of the bonds, in the sum of $50,000 would be wasteful and extravagant and of no benefit to taxpayers.

•

Los Angeles Votes To Buy Power System

At an election which drew but a fifth the ballots cast in the presidential vote, Los Angeles last month voted by a 2 to 1 margin to purchase electrical properties of the Los Angeles Gas & Electric Co. The price, previously fixed by agreement, is $46,340,000.

Only a majority vote was needed for approval, which authorized the Bureau of Power & Light to borrow the money needed for purchase and repay it out of revenue. The amendment included granting 35-year franchises to three gas companies.

E. F. Scattergood, chief engineer and general manager of the bureau, said the merger of the new properties with existing municipal facilities will add $3,000,000 a year to bureau profits. The City expects to consummate purchase soon after ratification by the State Legislature this month.

Welcoming the first new electric range off the production line of this new western manufacturer of ranges and water heaters, were H. H. Newton, sales manager; J. R. Giddes, designer; Rayburn Woolwine, manager; and Loring McDonald, general manager

New Western Range Factory Starts Production Lines

COINCIDENTAL with the entrance of Boulder Dam Power on the California market, came a new California-made electric range to help utilize this newly developed energy. Recently in Los Angeles, the first electric range came down the production line of the Woolwine Co., a 24-year-old manufacturer of household appliances, which, after a year of intense study and research, redesigning and planning, went into full production on Woolwine electric ranges and water heaters. This step was taken after careful investigation which conclusively proved that there is a large market for electrical ranges and water heaters of Western manufacture, according to Loring McDonald who heads the company.

Featured in the new line are six models of ranges and three of water heaters; one is a full size electric range to retail at $89.50. This range has been designed to open up a large heretofore undeveloped market for electric ranges in the lower price bracket. It has top dimensions of 41″ x 21″, four open surface heating elements, a heat-controlled oven and warming compartment.

The 80,000 sq. ft. Woolwine plant was completely remodeled and redesigned to handle the new line. Two production lines for ranges 120 ft. in length, for water heaters, 100 ft. in length, assure mass production with efficiency and economy and a capacity of 150 electric ranges and 50 water heaters per day.

Designing and technical engineering of electrical products are in the hands of J. R. Giddes, identified as an authority on electrical appliance design. Mr. McDonald, general manager, has been a partner in McDonald Bros. in Boston, consulting engineers. Management of the plant is in the hands of Rayburn Woolwine who has acted in that capacity for a number of years while producing various household and metal appliances. Sales are being directed by H. H. Newton, who comes to the Woolwine Co. with a successful background of department store and appliance merchandising.

Sales of electric ranges and water heaters will be confined to 11 Western states. A dealer organization has been built up in southern California, and plans are now being made to expand to the other sections of the Western market. All sales are made on a direct factory-to-dealer basis. A sales merchandising and advertising program, employing the use of cooking schools and supported with a heavy campaign in Western newspapers, magazines and radio is planned.

One year before actual production was undertaken, Henry B. Lange & Co., market analysts, were engaged, and thousands of kitchen door calls were made on representative housewives to determine their needs and preferences in designing and styling features. The results of these calls were carefully checked, tabulated, and their suggestions used in building this stove.

"No other methods," states Mr. McDonald, "would assure us a more enthusiastic reception than this proven means of determining just what the public wants."

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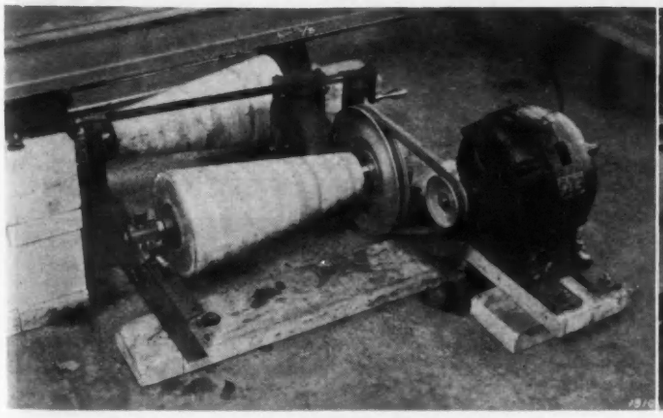

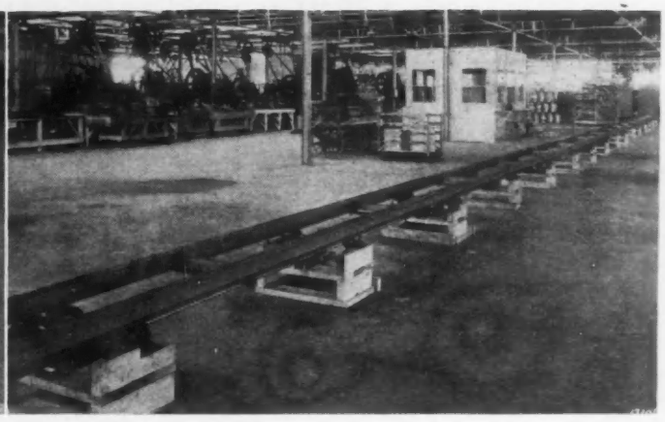

Paired cones, shown at left, are used to control speed of the production line conveyors on which ranges and water heaters are assembled. At right is the new type continuous traveling-rail production line. Its length is 120 ft., capacity, 120 ranges a day

Reliable

STRAIGHTLINE SPLICE

If the lineman can push the wire into the Splice, the wire is in to stay.

Ends fitting wire closely prevent insertion of wires that are burred or out of shape—prevent insertion of oversized wires—eliminating possible troubles.

Splices develop approximately 100% strength of solid wires and approximately 98% on seven strand.

Made entirely of non-corrosive parts—can be cleaned and reused.

Reliable ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE · CHICAGO ILLINOIS

Sacramento to Start Condemnation of P. G. & E.

Directors of the Sacramento Municipal Utility District last month unanimously instructed its attorneys to prepare condemnation proceedings against the Pacific Gas & Electric Co., with a view toward acquisition of the company's electrical distribution system. At the same time they ordered filing of an action with the State Railroad Commission to establish the district's rates.

Although condemnation was expected to be filed with the commission, suit might be brought in the Sacramento County Superior Court. Inventory of company properties would probably require three months. The company then would have 90 days in which to submit its findings to the commission. A value survey by the commission would follow.

Several weeks ago, Lester S. Ready and H. G. Butler, consulting engineers, filed a report with the district directors recommending immediate condemnation or purchase of the company's system.

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• APPRENTICESHIP REGULATIONS, framed by the provincial government of British Columbia, now apply to all branches of the electrical industry. Wage scales applying to apprentices in electrical contracting, engineering and power plant operation have been augmented by a classification applying to servicing of current consuming electrical appliances. Articles of indenture are required to be submitted to the Provincial Apprenticeship Council. Wages for the three-year apprenticeship in the new classification begin at $6 per week, with $2 raises every six months.

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• SPECIAL DISCOUNTS, granted by the Puget Sound Power & Light Co. on pooled bills at more than one building in return for the owner's service in collecting, last month were the subject of a Seattle hearing by the State Department of Public Service. Small apartment house owners said the system gave large operators an unfair advantage. Seattle City Light allows similar discounts.

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• EXECUTIVE COMMITTEE of the National Electrical Contractors Assn. will meet Jan. 18 in New York City. A. L. Stone, Stone Electric Supply Co., Los Angeles, representing California, Arizona and Nevada, intends to be present as does Sam Hepler, representing Washington, Oregon, Idaho, Utah and Montana. Important subjects, such as the change in national dues, will make this meeting significant.

A New Standard
—OF ACCURACY
—OF CONVENIENCE

Straight-line accuracy and ample current-carrying capacity for twice the rated load.

TYPE J PORTABLE TEST METERS

A completely sealed assembly with all knobs and current terminals above the case.

Western Offices:
DENVER
1526 Blake St.
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PHOENIX
1318 W. Lynwood St.
SAN FRANCISCO
1061 Howard St.
SEATTLE
220 Ninth Ave. N.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

• PRIME MOVERS COMMITTEE, Pacific Coast Electrical Assn., was entertained recently by Southern Sierras Power Co., at Boulder City. A breakfast was held at Anderson Dining Hall under the direction of V. E. Johnson of the steam plant. The committee made a two days' inspection tour of Boulder Dam and power house, which included a talk by George M. Wills, general superintendent of the company. Two of the new large generators were in operation at the time.

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• THE ROTARIAN, magazine of the Rotary Club, carries in its December issue a debate on public ownership of utilities between John Bauer, director, the American Public Utilities Bureau, and C. W. Kellogg, president, Edison Electric Institute.

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• PUBLIC OWNERSHIP committees in Seattle are circulating petitions in an effort to obtain 5,000 signatures requesting city authorities to obtain and make public an estimated price for purchase of Puget Sound Power & Light Co. holdings there. City Light Superintendent J. D. Ross, in answer to an inquiry, offered to state an estimated price, suggesting that it be substantiated by Federal experts.

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• NO MORE HOUSE-TO-HOUSE—Lewiston, Idaho, has enacted a city ordinance which is curtailing appliance sales. House-to-house canvassing or trespassing a citizen's property to sell, without first obtaining permission of the owner by telephone, are prohibited.

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• PRELIMINARY to possible taxing of the Pacific Gas & Electric Co. for gas franchises in San Francisco, Assistant City Attorney Dion Holm has undertaken a study of the methods used by Los Angeles in forcing the Los Angeles Gas & Electric Co. to obtain a franchise. Like Los Angeles, San Francisco may seek to combine gas franchise agreements with plans to purchase the company's electric distribution system. The agreement in Los Angeles led to the company's taking out a franchise for use of the streets, paying a 1 per cent gross tax on sales and $505.000 for past use of streets, and selling its electric distribution system to the city for $46,000,000.

•

• ANNOUNCED as the ultimate in radio achievement the Crosley Radio Corp. has just brought forth a 37-tube radio equipped with six speakers and several other features to list at a price of $1,500.

Your 1937 copy is ready. Send for it now

For Uniformity of Metal

For Strength with Lightness

For Dependable High Lines

Specify, BTC Drop Forgings

THROUGH YOUR OWN INSULATOR MFR.

THE BREWER-TITCHENER CORPORATION
CORTLAND, NEW YORK

• PRELIMINARY to discussing renewal of the British Columbia Electric Railway Co. franchise, the franchise committee of Victoria, B. C. recently decided to investigate systems in other cities, including diesel and steam-operated plants in Canada and the United States. The present franchise expires in November 1938.

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• SUBMARINE CABLE will extend power facilities to Salt Spring Island in British Columbia, it was announced by Nanaimo-Duncan Utilities, Ltd. Work was scheduled to start immediately.

Crapo
GALVANIZED PRODUCTS

Seven Wire Steel Strand

Telephone and Telegraph Wire

Crapo Galvanized Steel Strand is quickly, easily and economically served. Its *pure zinc* coating is so adherent and so ductile that it withstands vigorous bending and twisting without cracking or peeling. This insures corrosion-resisting joints, longer years of service, lower maintenance costs.

Crapo Galvanized Seven Wire Steel Strand and Telephone and Telegraph Wire are available in all standard grades and sizes.

Indiana Steel & Wire Co.
Muncie, Indiana

One of the 28 new 12-ton, 21 passenger Douglas planes, to be guided by radio

Beams to Guide New Air Liners

Three radio beams, by which observers say a pilot can guide his plane with the precision of a locomotive following rails, have been adopted by United Air Lines to protect its $3,000,000 fleet of 28 Douglas air-liners, purchased for mid-continent and western service.

The improved technique of instrument flying, said to enable pilots to land the 12-ton planes safely in densest fog, is the result of secret experimental flights conducted by United Air Lines during the past eight months.

First of the beams is for flying. Operated on 4,200 kilocycles, it connects all airways of the continent, informing the pilot by signals when he is on his course. It is transmitted by the main radio station on the field. Extending upward from this to 20,000 ft., is a cone of silence. A decrease, followed by a surge, in signal strength, lets the pilot know he is over his home station.

The second, or directional beam, is transmitted at 232 kilocycles from the center far end of the airdrome. Although it extends to a high altitude, it is but 5 ft. wide at the landing circle on the field, 10 ft. at the border, and 300 ft. at one mile.

The third, or landing beam, operating on 93,000 kilocycles, is transmitted from a small station close to the directional beam transmitter. It is thin and horizontal. At the landing circle it is 15 ft. from the ground, at the border of the field 60 ft., at a mile 300 ft., and at 10 miles it shoots up almost vertically.

As an added safeguard, all United planes have been ordered equipped with dual radio facilities.

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• U. S. DEPARTMENT OF COMMERCE has available a multigraphed 120-page market research text on "Markets for Electrical and Gas Facilities in Residences." The analysis was made in 64 cities, among which was San Diego, Calif. Data is available for 10 cents from the San Francisco office of the Bureau of Foreign & Domestic Commerce in the Custom House, San Francisco.

•

• SURVEY WORK will start immediately for a new 18-mile 110-kv. line to be constructed between Tekoa and Garfield in eastern Washington by the Washington Water Power Co. It will replace a 60-kv. line built 30 years ago, according to J. E. E. Royer, vice-president and general manager. This line will complete a 110-kv. dual circuit serving the Palouse region south of Spokane.

LAPP
LINE POST INSULATORS

Lapp Line Post Insulators eliminate radio interference due to both dirt and electro-static conditions.

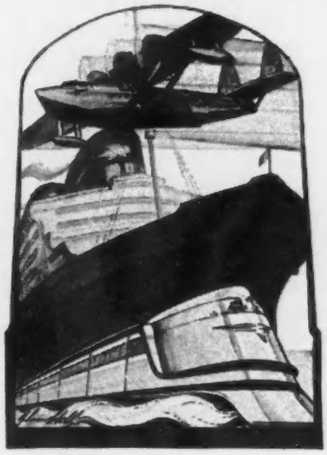
★

Write for Bulletin No. 123 describing and cataloguing these insulators.
LAPP INSULATOR CO., Inc.
Le Roy, N. Y.

Los Angeles MAYDWELL & HARTZELL INCORPORATED San Francisco

★ *Electrical Engineers and Manufacturers' Representatives* ★

For Western
TRANSPORTATION



CROCKER
FIRST NATIONAL
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Member Federal Deposit Insurance Corporation

MAYDWELL

Glass Insulators

All Standard Numbers
For All Purposes

Made of high quality materials in a modern Pacific Coast plant producing an unusually tough glass to withstand all severe service conditions.

MAYDWELL & HARTZELL
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Electrical Engineers and Manufacturers' Representatives
Los Angeles ★ San Francisco

...about People

Founder of Inspectors' Association Dies

Herbert Stitt, father of the electrical inspectors' association in California, died suddenly of heart attack at his home in Fresno Dec. 18. Known

HERBERT STITT

throughout the San Joaquin valley as the Red Seal representative, Mr. Stitt was mourned by the entire industry of the central valley region.

Serving his apprenticeship as wireman and electrician in the east, Mr. Stitt came to California about 25 years ago. He was Fresno city inspector for about 15 years. Sensing the need for uniform Code he first called together inspectors of several California cities in 1924 and out of that meeting the California Electrical Inspectors Association was formed.

Two years later he left the city employ to become the field representative of the California Electrical Bureau, In this capacity he worked tirelessly for Red Seal all-electric homes, for Standard ordinances and for county inspection, as well as in support of all industry promotional activities.

•

• JOHN R. READ has been appointed vice-president of the Canadian Westinghouse Company, with headquarters at Hamilton, Ontario, according to a recent announcement. Mr. Read was for many years district manager at Vancouver.

•

• JOHN BANKUS, for many years electrical engineer for Portland General Electric Co., Portland, has been appointed assistant chief engineer. Walter Brenton is chief engineer.

•

• C. J. WHITE, vice-president of the Tork Clock Co., was a recent visitor in Los Angeles and San Francisco. He is a former Long Beach contractor.

BETTER PLIERS

● Klein Pliers are made for the man who needs or appreciates a remarkably fine tool.

From the careful inspection of the alloy tool steel made to the most exacting specifications—

Through the old craftsman methods of individual manufacturing and individual heat treating—

To the final steps of rigid inspection and testing, each pair of pliers that carries the Klein trademark represents the maximum in plier quality.

Klein methods viewed in the light of modern mass production are necessarily more costly.

On the other hand, for a man who demands a plier of Klein quality there is no way to produce it except the Klein way.

Mathias KLEIN & Sons
Established 1857 — Chicago, ILL. U.S.A.
3200 BELMONT AVENUE, CHICAGO, ILL.

LINCOLN
MAXIMUM DEMAND METERS

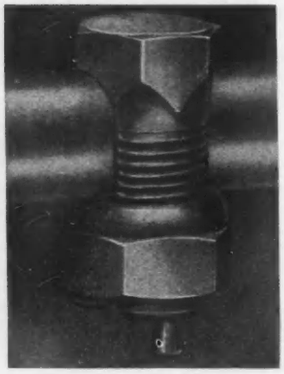
Ampere Demand Meter

For measuring demand in amperes

A complete line of Watt and Ampere Demand Meters

LINCOLN METER COMP
SPRINGFIELD, ILLINOIS

KEARNEY



CON-NEC-TITES

GIVE MAXIMUM CONDUCTIVITY

Smooth, rounded corners—no sharp edges—full round washer—nut retainer—made of brass, bronze or copper—full range of sizes—all types.

MAYDWELL & HARTZELL
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Electrical Engineers and Manufacturers' Representatives

Los Angeles ★ San Francisco

• EARL WHITEHORNE, McGraw-Hill editor, has been placed in charge of *Electrical Contracting* magazine upon the transfer of Sam Williams, editor for many years, to managing editor of *Electrical World*. Mr. Whitehorne has been an editor at large on several of the McGraw-Hill magazines, particularly of the electrical group. He joined the McGraw-Hill Co. in 1915 at which time he was an electrical contractor. He acted as chairman of the national wiring committee.

•

• WILLIAM P. STRANDBORG, for many years manager of the public relations department of Portland Electric Power Co., died in a Portland hospital of cerebral hemorrhage Dec. 10. He had been retired because of ill health for the past three years. Sixty years old, he had been with the company since 1915, following a colorful newspaper career. He is remembered as editor of Watt's Watt, company publication for customers, and was prominent in civic affairs.

•

• MISS FREDA HALL has succeeded Miss Harriet Klumpp as supervisor of Northwestern Electric Co.'s home lighting staff. A graduate of Oregon University, she joined the company's home lighting staff in March of last year.

•

• RALPH KORTEPETER, sales manager of the Apex Rotarex Manufacturing Co. of Oakland, has recently been transferred to the parent organization with headquarters in Cleveland. Earl Hotaling has been appointed sales manager in his place for the Pacific Coast.

•

• J. O. PRESBREY, 385 East 2d St., Los Angeles, is again representing The Miller Co. of Meriden, Conn., in Southern California, Arizona, New Mexico and El Paso.

•

• CHANGES IN PORTLAND furniture appliance departments are: Oscar C. Edlund, to appliance manager, Edwards Furniture Co., succeeding Vic Johnson, who has taken a similar position with Roberts Brothers; Herb Mathiew, formerly of Edwards, also to Roberts Brothers.

•

• JOHN W. WISDOM JR., for 11 years with the Northwestern Electric Co., Portland, was accidentally killed by monoxide poisoning in the garage of his home in Portland Nov. 30.

•

• HAL G. GARDNER, lighting specialist with the Puget Sound Power & Light Co. for 12 years, recently resigned his position to become factory representative of the Pittsburg Reflector Co. with offices in the Flatiron Bld., San Francisco.

E. F. Perkins Is Wesix Los Angeles Manager

E. F. Perkins terminated a fifteen year career with the sales department of the Pacific Gas and Electric Co. to become division sales manager of the Wesix Electric Heater Co. at Los Angeles. He will direct the sales of the Los Angeles Wesix factory covering the territory of southern California as well as New Mexico, Arizona and Texas.

•

• MRS. WINIFRED DAVISON has joined the Coast Counties Gas & Electric Co. as home service representative. Mrs. Davison is widely experienced in the use and demonstration of electric and gas cooking equipment. This is the utility's initial step in home service work, initiated to increase customer satisfaction and to gain new users.

•

• H. C. WOODRUFF, electrical engineer for the Washington Gas & Electric Co., died recently in an automobile accident.

PROFESSIONAL SERVICES

ELECTRICAL TESTING LABORATORIES

Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.

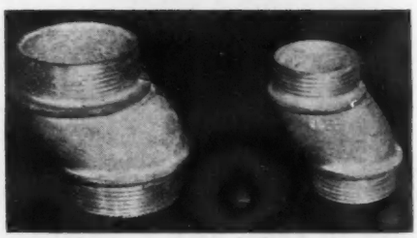
80th St. and East End Ave., New York

ARTHUR R. KELLEY
CONSULTING ENGINEER

Reports and Valuations, Public Utility Industrial Properties

Edison Bldg. Los Angeles

Utility Nipple

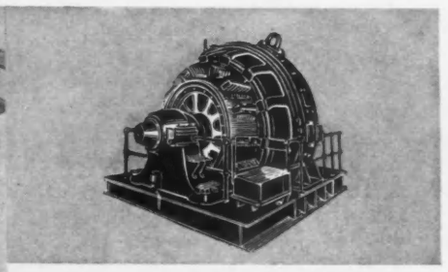


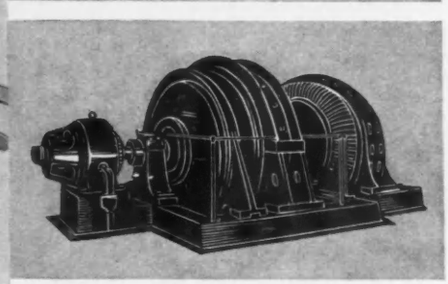
An offset nipple* which permits mounting of switches, gutter outlet boxes and other equipment where knockouts don't line up. Sizes available are ½, ¾, 1¼, 1½ and 2 in. All are the same length, 1⅝ in. between shoulders.

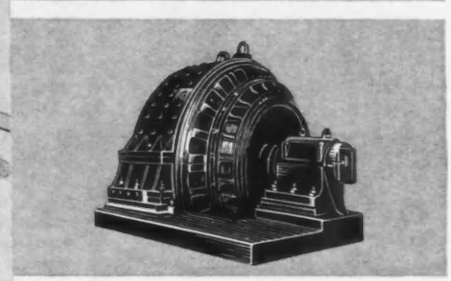
B. HARTMAN
168 Sunset Street Long Beach, Calif.
**Patent applied for.*

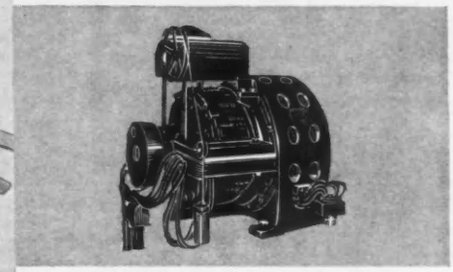
"SA" SERIES BRUSHES

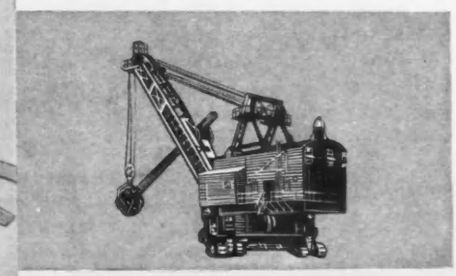
. . . *cover broad field of service*











● "SA" Series grades are designed, primarily, for heavy duty service, but their range of application is very broad. The properties which enable them to give outstanding performance in heavy duty service adapt them, likewise, to almost every class of commutating type equipment, both A. C. and D. C.

"SA" Series brushes are setting new standards of performance on many applications involving sustained heavy loads, severe peaks and difficult commutating conditions.

1. On synchronous rotary converters they demonstrate the dependable performance essential to automatic substation operation.
2. On mill drive generators they stand up under severe load peaks.
3. On blooming mill motors they provide insurance against costly shut-downs.
4. On commutating type A. C. motors they successfully meet severe commutating conditions.
5. On electric shovel generators they greatly reduce maintenance costs.

THERE IS A NATIONAL CARBON BRUSH FOR EVERY CLASS OF SERVICE

Let our engineers solve your brush problems

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide UCC and Carbon Corporation
Carbon Sales Division, Cleveland, Ohio
GENERAL OFFICES: 30 EAST 42ND STREET, NEW YORK, N. Y.
BRANCH SALES OFFICES: NEW YORK - PITTSBURGH - CHICAGO - SAN FRANCISCO

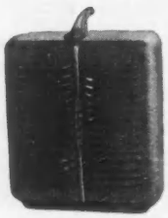
Thermador

ELECTRIC ROOM HEATERS

Complete heating with Thermadors is winning widespread acceptance in residences, schools, hospitals, apartments, offices—every place where clean, safe, economical heat is desired.

Thermadors offer the most economical form of electric heat because of their high-speed and efficiency.

DEALERS—Have you seen the new HEAT FAN Portable Electric?



Here's a quick turn-over, long-profit electric heater. A year-round seller. Thermador quality throughout.

Write today for complete literature and price lists on Thermador room heaters and water heaters.

"Seven Leagues Ahead"

Thermador Electrical Mfg. Co.

Factory: 2821 East Pico Blvd., Los Angeles
557 Market St., San Francisco
Builders Exchange—Fresno

..about the Trade

Pacific Electric Becomes Independent

Pacific Electric Manufacturing Corp. has become a completely California owned and operated corporation with the purchase by President Joseph S. Thompson of all stock and interest formerly held by General Electric Co. G. E. secured a virtual half interest 8 years ago.

With the present sale, James A. Cranston retired from the board of directors. Officers of the company remain the same. The corporation operates a factory occupying two city blocks in San Francisco and a branch maintenance plant in Gary, Ind. Manufactures include high voltage switches, oil circuit breakers, high voltage fuses and kindred apparatus.

•

• GRAYBAR ELECTRIC CO., at Phoenix, Ariz., was one of seven new distributors recently appointed by Leonard Refrigerator Co.

•

• KELVINATOR'S national field organization has been increased for distribution of its increased line of domestic appliances. In the West, J. L. Conover, San Francisco, heads both domestic and commercial divisions. Domestic district managers have been appointed as follows: L. Klein, Seattle, Wash.; H. L. Percy, Denver, Colo.; and Al F. Rice, San Francisco. Mr. Rice has been identified with the Kelvinator organization through the H. R. Basford Co. during the past several years.

•

• WALTER SPENCER, Spencer Electric Co., recently moved from 570 Natoma St., San Francisco, to 233 Monadnock Bldg.

•

• ELECTRIC HEAT SHOP, dealers in electrical appliances and electric heating, have moved from 441 Sutter St. to 1028 Geary St., San Francisco.

•

• ALLIED INDUSTRIES, INC., coincident with notice of moving its executive office from San Francisco to Los Angeles, announced that L. T. Stewart, secretary and treasurer of the company, and F. McL. Brinckerhoff, his assistant, have been added to the personnel of the Los Angeles organization by the change.

•

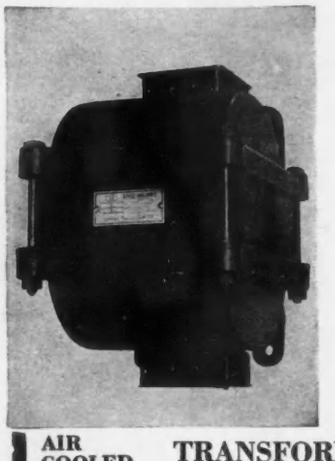
• WASHINGTON ELECTRIC APPLIANCE Co., Spokane, recently doubled its floorspace, in moving to a new corner location in the Paulsen Medical and Dental Bldg., Riverside Ave. Former location was 405 Riverside. E. S. Bergquist, owner, has been in the appliance business in Spokane 8 years.

• GILBERT, WESTON & STEARNS, electrical contractors of Santa Ana, Calif., recently returned to their old address at 609 East Fourth St. from 204 North Main St., having sold their merchandise business to B & G Electric Co. at 213 North Broadway, Santa Ana.

•

• ESCONDIDO RADIO SERVICE, Escondido, Calif., has moved to 126 E. Grand Ave. and extended its line to include all appliances.

YOU SAVE



With JEFFRIES

AIR COOLED TRANSFORMERS

● With a Jeffries Air Cooled Transformer money can be saved. The Air Cooled construction lengthens the life of the transformer and lowers repair costs. Plant expansion and extension can be made economically for a Jeffries Transformer provides the voltage change at the point desired without the need of long and expensive conduit runs. Besides a complete line of standard transformers, special designs and voltage furnished to order. Type S. S. Transformer 1 to 5 K.V.A. illustrated.

JEFFRIES TRANSFORMER COMPANY
5706 LONG BEACH AVE., LOS ANGELES

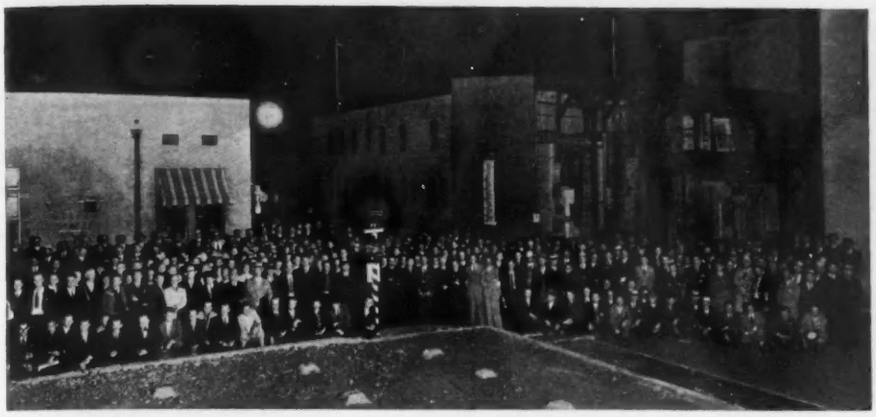
FOR
- *Lasting Economy*
- *Strength*
- *Safety*

USE

LOCUST PINS
Oak Brackets and Pole Steps

LOCUST PIN CO. FRONT ROYAL, VA.

MAYDWELL & HARTZELL
INCORPORATED
Los Angeles ★ San Francisco



Maintenance Engineers In Record Meeting

When Earl O. Miller, chief electrician of R.K.O. studios, was host to the Electrical Maintenance Engineers Assn. of Southern California at a meeting at the studios Nov. 17, 315 maintenance engineers turned out. It proved to be the largest meeting ever held by the E.M.E.A. After short talks, sound stages and lighting apparatus inspected as setup for the "shooting" of scenes. The accompanying photograph, by the way, was taken in the light of a scissors lightning flash, used for storm scenes, an arc carrying 2,500 amp. The December meeting was to be a combination Christmas party and Gadget Night, at which members were to exhibit equipment which they had devised and which is being used in plants to carry on maintenance.

To make it more interesting Westinghouse Electric & Manufacturing Co. and General Electric Co. offered prizes for the two best gadgets presented. The first prize was won by C. F. Kimball, Ford Motor Co., for his gadget, an automatic fuse tester. He was given a General Electric quarter horsepower motor. The second prize of Westinghouse electric iron was awarded to Jerry Ellis, Knudsen Creamery Co., for a stop switch for reversible motors.

HONN'S SERVICE
BUILDS BUSINESS

Geo. E. Honn Company
420 Market St., San Francisco

Manufacturers Representative for:

Tree Trimming Equipment
● Bartlett Manufacturing Co.

Friction and Rubber Tapes
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Pyrex Insulators
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Transformers
● Gardner Electric Mfg. Co
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● Lee Skipwith & Co., Inc.
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Cable Grips
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Neon Multiple Plug Fuses
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Fuses, Cutouts, Protective Devices
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Connectors, Ground Rod Clamps, Utility Hoists
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HEMINGRAY
Glass
INSULATORS

for primary and secondary insulation service and rural line needs.

Brass-bushed for great strength, perfect threads and full protection against pin expansion.

Hemingray provides many advantages: greater mechanical strength . . . sustained dielectric strength . . . unaffected by sudden temperature changes . . . withstands maximum insulator pin expansion . . . never ages or deteriorates . . . all surfaces impervious to moisture . . . tougher—withstands rough handling . . . clear and flawless for easy inspection.

Available in all styles . . . clear or brown glass . . . ratings up to 15,000 volts. Write for samples.
Owens-Illinois Glass Company . . . Muncie, Indiana.

Underground Transmission

Without Conduit

Note the air and moisture proof flexible coverings. Sealtite represents a distinct advance in parkway cable construction. It is more pliable than any other underground cable . . . and costs are considerably lower.

Write for booklet offering suggested uses and explaining long life.

SEALTITE
Parkway and Airport Cable with Maximum Flexibility by
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WHERE TO BUY IT IN THE WEST

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Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks

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Pittsfield, Mass.

Air Conditioning
Frigidaire Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Kelvinator Corp.
Norge Division, Borg-Warner Corp.

Ammeters and Voltmeters
Bristol Co.
General Elec. Co.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec. Instr. Corp.

Anchors, Guy
A. B. Chance Co.
Hubbard & Co.
James R. Kearney Corp.

Anchor and Guy Rods
A. B. Chance Co.
General Elec. Co.
Hubbard & Co.
Maydwell & Hartzell, Inc.

Appliances, Household
Edison Gen. Elec. Appliance Co., Inc.
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
McGraw Elec. Co.
National Enameling & Stamping Co.
The Silex Co.
Waters-Genter Div.
Westinghouse Elec. Supply Co.

Belts, Safety Straps, Pole Climbers
Western Hardware & Tool Co.

Boxes
General Cable Corp.
General Elec. Co.
Superior Switchboard & Devices Co.

Brackets, Wood
Locust Pin Co.

Breakers

Air Circuit Breakers
General Elec. Co.
I-T-E Circuit Breaker Co.
Roller-Smith Co.
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.

Oil Circuit Breakers
Allis-Chalmers Mfg. Co.
Delta-Star Electric Co.
General Elec. Co.
Pacific Elec. Mfg. Corp.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.

Bus Fittings
Burndy Eng'g Co.
General Elec. Co.
Pacific Elec. Mfg. Corp.

Buses
Aluminum Co. of America

Cable Accessories
General Cable Corp.
General Elec. Co.
John A. Roebling's Sons Co.

Cables
Aluminum Co. of America
American Steel & Wire Co.
Columbia Steel Co.
Crucible Steel Co. of America
General Cable Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Maydwell & Hartzell, Inc.
National Elec. Products Corp.
The Okonite Co.
Okonite-Callender Cable Co.
Providence Insulated Wire Co.
Rockbestos Products Corp.
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Westinghouse Elec. & Mfg. Co.

Carbon Brushes
National Carbon Co., Inc.

Carbon Products
National Carbon Co., Inc.

Chimes
Square D Co., Inc.

Clamps, Ground
B. Hartman
Reliable Elec. Co.

Coffee Makers
The Silex Co.

Coil Winding
Jeffries Transformer Co.

Commutator Dressers
Ideal Commutator Dresser Co.

Compounds, Insulating
Clifton Mfg. Co.
General Cable Corp.
General Elec. Co.

Condensers, Electric
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Conduit
Aluminum Co. of America
General Elec. Co.
Youngstown Sheet & Tube Co.

Conduit, Underground
Fire Proof Wall Co.
Johns-Manville Corp.

Connectors
Burndy Eng'g Co.
James R. Kearney Corp.
Reliable Elec. Co.

Controllers
Allis-Chalmers Mfg. Co.
General Elec. Co.
Square D Co.
Westinghouse Elec. & Mfg. Co.

Cutouts
James R. Kearney Corp.
General Elec. Co.
Schweitzer & Conrad, Inc.
Westinghouse Elec. & Mfg. Co.

Demand Control
General Elec. Co.
Wesix, Inc.

Distribution Specialties
General Elec. Co.
Hubbard & Co.
James R. Kearney Corp.
Maydwell & Hartzell, Inc.
St. Louis Malleable Casting Co.
Superior Switchboard & Devices Co.

Electrodes, Arc Welding
John A. Roebling's Sons Co.
General Elec. Co.

Enclosures, Meter and Instrument
Superior Switchboard & Devices Co.

Fans
General Elec. Co.
B. Hartman

Farm Electrification Equipment
General Elec. Co.

Fittings, Conduit
General Elec. Co.

Fittings, Insulator
Brewer-Titchener Corp.

Roller-Smith Company

3 Barclay St., New York City — Works: Bethlehem, Pa.

★ INSTRUMENTS (Indicating and Graphic)
★ CIRCUIT BREAKERS (Air and Oil)
★ INSTRUMENT AND CONTROL SWITCHES
★ SWITCHGEAR
★ RELAY

Sales Agents: Electric Material Co., San Francisco and Los Angeles. J. C. McDougall, Seattle. Mark G. Mueller, Denver. T. E. Geary, Omaha.

Fixtures, Lighting
Benjamin Elec. Mfg. Co.
General Elec. Co.
Pittsburgh Reflector Co.
Smoot-Holman Co.
Westinghouse Elec. & Mfg. Co.

Floodlighting
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Pittsburgh Reflector Co.
S & M Lamp Co., Inc.
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Westinghouse Elec. & Mfg. Co.

Flumes
California Corrugated Culvert Co.
R. Hardesty Mfg. Co.
Pure Iron Culvert & Mfg. Co.
Washington Corrugated Culvert Co.
Western Metal Mfg. Co.

Gasoline
Union Oil Co.

Gates
California Corrugated Culvert Co.
R. Hardesty Mfg. Co.
Pure Iron Culvert & Mfg. Co.
Washington Corrugated Culvert Co.
Western Metal Mfg. Co.

Generators
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Graphite Products
National Carbon Co., Inc.

Ground Rods
Maydwell & Hartzell, Inc.

Heaters, Air
Edison Gen. Elec. Appliance Co.
Nobilitt-Sparks Industries, Inc.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Edw. L. Wiegand Co.

Heaters, Water
Edison Gen. Elec. Appliance Co.
Fowler Mfg. Co.
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
Standard Elec. Stove Co.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Westinghouse Elec. & Mfg. Co.

Heating Element—Repair Part
Edw. L. Wiegand Co.

Instruments, Measuring and Recording
See Ammeters, Voltmeters, Wattmeters.

Insulation
General Elec. Co.
Johns-Manville Corp.
Ohio Brass Co.

Insulators
Brewer-Titchener Corp.
Corning Glass Works
Graybar Elec. Co., Inc.
Hemingray Glass Co.
Geo. E. Honn Co.
Lapp Insulator Co., Inc.
Maydwell & Hartzell, Inc.
Ohio Brass Co.
Owens-Illinois Glass Co.
Westinghouse Elec. & Mfg. Co.

Ironers
Easy Washing Machine Corp.
General Elec. Co.
Norge Division, Borg-Warner Corp.
Savage Distributing Co.

Knobs, Tubes, Cleats
Standard Elec'l Porcelain Mfrs.

Lamp Replacers
G. C. A. Mfg. Co.

Lamps, I. E. S.
Faries Mfg. Co.
General Elec. Co.
Lumidor Mfg. Co., Inc.

Lamps, Mazda
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Westinghouse Lamp Co.

Lamps, Student
Lumidor Mfg. Co., Inc.

Lamps, Sun
General Elec. Co.

Lighting Equipment
Benjamin Elec. Mfg. Co.
Crouse-Hinds Co.
Curtis Lighting, Inc.
Faries Mfg. Co.
Smoot-Holman Co.
Westinghouse Elec. & Mfg. Co.
Wuelker Reflector Mfg. Co.

Line Material
Maydwell & Hartzell, Inc.
Ohio Brass Co.

Meters
The Bristol Co.
General Elec. Co.
Lincoln Meter Co.
L. A. Nott
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Corp.

Motors
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Motor Starters
Allis-Chalmers Mfg. Co.
General Elec. Co.
Square D. Co., Inc.
Westinghouse Elec. & Mfg. Co.

Oil, Lubricating
Associated Oil Co.
Union Oil Co.

Oil, Transformer & Switch
Associated Oil Co.
General Elec. Co.
Union Oil Co.

Panel Boards
General Elec. Co.
Square D Co., Inc.
Superior Switchboard & Devices Co.
Westinghouse Elec. & Mfg. Co.

Photoelectric Cells
General Elec. Co.
Weston Elec'l Instrument Corp.

Pins, Wood
Locust Pin Co.

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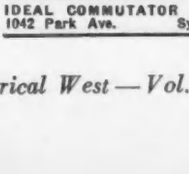

IDEAL "JUMBO" cleaner Blows, Vacuums, Sprays. Powerful! Let us prove its superiority. 10 day free trial.

IDEAL COMMUTATOR DRESSER CO.
1042 Park Ave. Sycamore, Illinois

Where to Buy It in the West—*Continued*

Pole Line Hardware
Brewer-Titchener Corp.
General Electric Supply Corp.
Graybar Electric Co., Inc.
Hubbard & Company
Joslyn Co. of California
Kortick Mfg. Co.
Maydwell & Hartzell, Inc.

Porcelain
Standard Elec. Porcelain Mfrs.

Public Utilities
California Oregon Power Co.
Idaho Power Co.
Mountain States Power Co.
Northwestern Electric Co.
Pacific Gas and Electric Co.
Pacific Power & Light Co.
Portland General Electric Co.
Puget Sound Power & Light Co.
San Diego Cons. Gas & Elec. Co.
San Joaquin Light & Power Corp.
Southern California Edison Co. Ltd.
Utah Power & Light Co.
Washington Water Power Co.

Pullers, Slack
A. B. Chance Co.

Pumps
Pelton Water Wheel Co.

Range Units
Edison Gen. Elec. Appliance Co.
Edwin L. Wiegand Co.

Ranges
Edison Gen. Elec. Appliance Co.
General Elec. Co.
General Elec. Supply Corp.
Kelvinator Corp.
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
Norge Division, Borg-Warner Corp.
Standard Elec. Stove Co.
Steiger & Kerr Stove & Fdry. Co.
Walker & Pratt Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Reflectors
Benjamin Elec. & Mfg. Co.
Curtis Lighting, Inc.
Pittsburgh Reflector Co.
Smoot-Holman Co.
Westinghouse Elec. & Mfg. Co.
Wuelker Reflector Mfg. Co.

Refrigerators
Frigidaire Corp.
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Kelvinator Corp.
Leonard Refrigerator Co.
Malleable Iron Range Co.
Norge Division, Borg-Warner Corp.
Westinghouse Elec. & Mfg. Co.

Relays
General Elec. Co.
Hart Mfg. Co.
Roller-Smith Co.
Square D Co., Inc.

Rheostats & Resistors
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Roasters
National Enameling & Stamping Co.
Westinghouse Elec. & Mfg. Co.

Rolls, Wringer
Lovell Mfg. Co.

Rural Line Hardware
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Hubbard & Co.
Joslyn Co. of Calif.
Kortick Mfg. Co.
Maydwell & Hartzell, Inc.

Service Organizations
Crocker First National Bank
Elec'l Testing Labs.
McGraw-Hill Book Co.
Northwest Elec. Light & Power Association
Pacific Coast Elec'l Ass'n
Pacific Coast Elec'l Bureau

Strand, Guy
Maydwell & Hartzell, Inc.
Pacific Wire Rope Co.

Street Lighting Fixtures
General Elec. Co.
Graybar Elec. Co., Inc.
Hubbard & Co.
Westinghouse Elec. & Mfg. Co.

Switchboards
Allis-Chalmers Mfg. Co.
General Elec. Co.
Roller-Smith Co.
Square D. Co., Inc.

Switches, Disconnect
Delta-Star Electric Co.
General Elec. Co.
Kearney Corp., James R.
Pacific Elec. Mfg. Corp.
Schweitzer & Conrad, Inc.
Westinghouse Elec. & Mfg. Co.

Switches, Fuse
General Elec. Co.
Kearney Corp., James R.
Schweitzer & Conrad, Inc.

Switches, Heater
Bryant Elec. Co.
General Elec. Co.
Hart Mfg. Co.

Switches, High Tension
James R. Kearney Corp.

Switches, Meter Test
General Elec. Co.
Meter Devices Co.
Square D Co., Inc.
Superior Switchboard & Devices Co.

Switches—Pressure and Temperature
The Bristol Co.
Hart Mfg. Co.
Square D Co., Inc.

Switches, Safety
Colt's Patent Fire Arms Mfg. Co.
General Elec. Co.
Square D Co., Inc.
Westinghouse Elec. & Mfg. Co.

Switches, Thermostat Controlled
Colt's Patent Fire Arms Mfg. Co.
General Elec. Co.
Hart Mfg. Co.
Thermador Elec'l Mfg. Co.

Switches, Time
General Elec. Co.
Sangamo Elec. Co.

Switchgear
Allis-Chalmers Mfg. Co.
Delta-Star Electric Co.
General Elec. Co.
I-T-E Circuit Breaker Co.
Westinghouse Elec. & Mfg. Co.

Tapes—Friction and Rubber
Clifton Mfg. Co.
Geo. E. Honn Co.

Telephone & Telegraph Hardware & Specialties
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Hubbard & Co.
Maydwell & Hartzell, Inc.

Telephone Systems—Private
American Automatic Elec. Sales Co.

Terminals, Cable
General Cable Corp.
General Elec. Co.

Testing Devices
Superior Switchboard & Devices Co.

Tools
Mathias Klein & Sons

Tools, Live Line
A. B. Chance Co.
James R. Kearney Corp.
Western Hardware & Tool Co.
Sangamo Elec. Co.

Transformers
Allis-Chalmers Mfg. Co.
Gardner Elec. Mfg. Co.
General Elec. Co.
Jeffries Transformer Co.
Western Transformer Co.
Westinghouse Elec. & Mfg. Co.

Tubing, Elec'l Metallic
Aluminum Co. of America

Turbines
Pelton Water Wheel Co.

Valves
Ohio Brass Co.
Pelton Water Wheel Co.

SAVED
$1600 in Capital Investment
IMPROVED SERVICE
by Maintaining Proper Voltage Levels

WHEN it became desirable to raise the voltage levels on a 10-mile branch feeder, the Gulf States Utilities Company, Beaumont, Texas, saved $1600 in capital investment by the installation of two G-E branch-feeder induction regulators four miles out on the line. The feeder was already regulated from the station, but load conditions were such that in order to maintain high-quality service, additional regulation was needed. To accomplish their purpose by rebuilding the line would have cost $4000 for copper alone, while the branch-feeder induction regulators were installed for $2400. Proper voltage levels were maintained, and service was improved.

A Complete Line—for Profitable Regulation

The complete line of G-E regulating equipment will enable you to regulate voltage economically on any part of your system, for any load density. For complete information, write for GES-1142A. Address the nearest G-E office, or General Electric, Dept. 6A-201, Schenectady, N.Y.

350-132
GENERAL ELECTRIC

★ ★ ★ MAKE IT ★ ★ ★

VERSATOL

and You Get the BEST in RUBBER-INSULATED Cable

FOR important power circuits, call for Versatol rubber-insulated cable and you get the best that our engineers know how to produce.

In Versatol are combined three most desired properties: heat resistance, moisture resistance, and long life.

Heat-resisting

Versatol is good for a copper temperature of 75 C. This means that cable insulated with it will not only stand such heat but will also have a greater current-carrying capacity.

Moisture-resisting

The moisture-absorption factor of Versatol is unusually low —0.010 gram per sq in. It could be soaked in water for years and still remain a good insulation, and its use in many cases permits the omission of lead sheath.

Superaging

Modern testing devices have made it possible to determine the relative performance of different rubber compounds. One of these is the oxygen bomb, and Versatol will pass a test in it of 504 hours, as compared with 96 hours for a 30 per cent insulation. Contrast the aging characteristics of these two compounds and you get a good idea of the superiority of Versatol.

In other insulations, you can obtain one or two of these properties, such as heat and moisture resistance, but no insulation combines all three properties.

You will want to investigate the use of Versatol cable for many important circuits. When the requirements of an installation are such as to call for a superior rubber-insulated cable, we should like to give you a quotation on Versatol.

Recall, however, that G.E. can supply any type of insulated cable—rubber, cloth, paper, asbestos—in every size for every application. We urge that care be exercised to select the one type that is best suited for each job. If you are ever in doubt, we invite you to call on a G-E cable specialist, whom you can reach through the nearest G-E sales office, or address General Electric, Dept.6E201, Schenectady, N. Y.

520-97H

GENERAL ELECTRIC

Where to Buy It in the West—*Continued*

Washers, Clothes
Easy Washing Machine Corp.
Elec't Appliance Service Corp.
General Elec. Co.
Little Giant, Inc., Ltd.
Norge Division, Borg-Warner Corp.
Savage Distributing Co.

Wattmeters
Bristol Co.
General Elec. Co.
L. A. Nott
Roller-Smith Co.
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec. Instrument Corp.

Water Wheels
Pelton Water Wheel Co.

Wire
Aluminum Co. of America
America Steel & Wire Co.
Columbia Steel Co.
Crescent Ins. Wire & Cable Co.
Crucible Steel Co.
General Cable Corp.
Hazard Ins. Wire Works
Keystone Steel & Wire Co.
National Elec. Products Corp.
The Okonite Co.
Providence Insulated Wire Co.
Rockbestos Products Corp.
United States Steel Corp.
Westinghouse Elec. Supply Co.

Wiring Supplies
Associated Sales Engineers
Bryant Electric Co.
Crouse-Hinds Co.
Gen. Elec. Supply Corp.
Graybar Elec. Co., Inc.
General Elec. Co.
Graybar Elec. Co., Inc.
Hart Mfg. Co.
Indiana Steel & Wire Co.
Maydwell & Hartzell, Inc.
Pacific Wire Rope Co.
John A. Roebling's Sons Co.
Westinghouse Elec. & Mfg. Co

Wringer Rolls
Lovell Mfg. Co.

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ANOTHER ELECTRIC *Rate* REDUCTION

ONLY a year ago, the P. G. and E. announced a substantial reduction in electric rates. According to the Federal Power Survey, our rates THEN were among the lowest in the country. Now we are pleased to announce a FURTHER reduction to be effective on February 1. Four million dollars were saved to our customers by the 1936 reduction. Three million MORE dollars will be saved by this reduction—A TOTAL SAVING OF SEVEN MILLION DOLLARS IN LITTLE MORE THAN A YEAR!

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PACIFIC GAS AND ELECTRIC COMPANY

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Let's Make the Inventory *Complete*

While taking an inventory of your physical assets and figuring profits for the year, how about checking over the intangible assets that really make those profits possible?

By intangible assets we mean your selling methods, your service policies, your plans for future operations. Here are the controlling factors in the success or failure of any business and it is important that they be made the subject of an occasional searching investigation.

This inventory is even more important than ever, now, since we are starting what promises to be the greatest year in the history of the electrical industry.

So, go over your sales and service departments with a fine tooth comb. Satisfy yourself that they are in perfect working order, powered with enthusiasm, and oiled with a sincere desire to serve.

Pacific Coast Electrical Bureau

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